

Climate Leadership Plan Progress Report



Alberta Climate Change Office, Government of Alberta
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Climate Leadership Plan Progress Report 2017-18

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About the CLP Progress Report

This 2017-18 report is government's second on the Climate Leadership Plan (CLP) and its progress. Announced in November 2015, the made-in-Alberta climate strategy brings together government, business, industry and the public to diversify our economy, create jobs and reduce greenhouse gas (GHG) emissions that cause climate change.

The report is an important tool for continual improvement and to share the significant work of government, industry and people in ensuring Alberta continues to be a world leader on climate action.

This progress report includes:

- A summary of 2017-18 climate leadership investments.
- An overview of expected progress towards long-term outcomes.
- A review of progress on each action area.
- An update on the programs that contribute to action areas and outcomes.

This report covers the fiscal year of April 1, 2017, to March 31, 2018, with indicator results based on the 2017 calendar year (unless otherwise noted).

Alberta's Climate Leadership Plan

Alberta emitted 38 per cent of Canada's GHG emissions in 2015, the highest in Canada. That same year, Alberta's CLP signaled meaningful and decisive local action on one of the most important global issues today. The plan creates incentives for reducing emissions; unlocks new opportunities for research and innovation; supports job creation in construction, planning and energy services; and grows future-ready services like renewable energy. It also improves Alberta's competitiveness as a global emitter in a lower carbon global economy by giving newly found confidence to business and industry to invest in technologies that reduce emissions. The plan continues to strengthen our economy, empower Albertans to play a role in climate leadership, and secure Alberta's position as one of the most responsible energy producers in the world.

Informed by the recommendations of the Climate Change Advisory Panel that heard from a wide range of Albertans, stakeholders, industry, and experts, the CLP includes four main policy measures:

- Implement a price on GHG emissions, or carbon pricing.
- Phase out pollution from coal-generated electricity by 2030, and have 30 per cent of Alberta's electricity come from renewable sources such as wind, hydro and solar by 2030.
- Limit oil sands GHG emissions at 100 megatonnes (Mt) per year.
- Reduce methane emissions from upstream oil and gas production by 45 per cent from 2014 levels by 2025.

These key policy measures, as well as the programming enabled by revenues generated from carbon pricing, support the main outcomes of the CLP:

- Reduced GHG emissions.
- A lower-carbon diversified economy.
- Increased community health and well-being.

Measuring and Reporting Progress

The CLP Outcome Framework provides the structure for measuring and reporting progress. It sets clearly defined outcomes and desired results, and forms the foundation for CLP programs and policies to:

- Map alignment to CLP outcomes.
- Identify measures/indicators to monitor, report and evaluate progress.
- Evaluate relevancy and effectiveness of CLP funding requests, policies and programs.

The framework, described below and included in the appendix, is updated since last year's progress report to reflect learning from over a year's worth of application. The action areas are revised slightly to better reflect the government's fiscal plan and to more clearly identify priorities.

What is Alberta Working to Achieve?

The CLP ultimately aims to achieve **Reduced Greenhouse Gas Emissions** while also working towards a **Lower-carbon Diversified Economy** and **Increased Community Health and Well-being**.



We are seeing immediate progress in the first two years of the CLP alone. We also know that the long-term, sustainable reduction of GHG emissions takes deliberate effort by many contributors over many years. While there are some factors that rest outside of government control, this plan sets clear policy goals where it can be most effective at the lowest cost to Albertans while maintaining industry competitiveness.

Policy Goals:

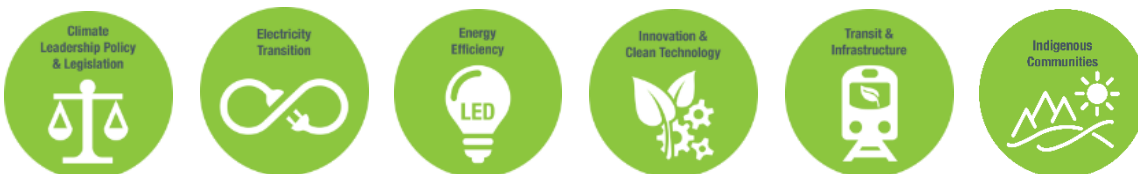
- 2017 onwards: Annual **oil sands GHG emissions are less than 100 Mt.**
- 2025: **Annual methane emissions from upstream oil and gas are decreased by 45 per cent** from 2014 levels.
- 2030: Pollution from **coal-generated electricity is ZERO.**
- 2030: **30 per cent** of electricity produced in Alberta is **from renewable energy sources.**

How Will We Get There?

Government, business, industry and the public – we all have a role in maintaining Alberta as a **climate leader**, in **accelerating the adoption of clean technology and innovation** for business and industry, and encouraging people to **actively participate in green practices.**

To encourage these changes, the CLP focuses on six action areas. The first action area, Policy and Legislation, is the government's primary driver. The remaining five action areas are enabled by carbon pricing.

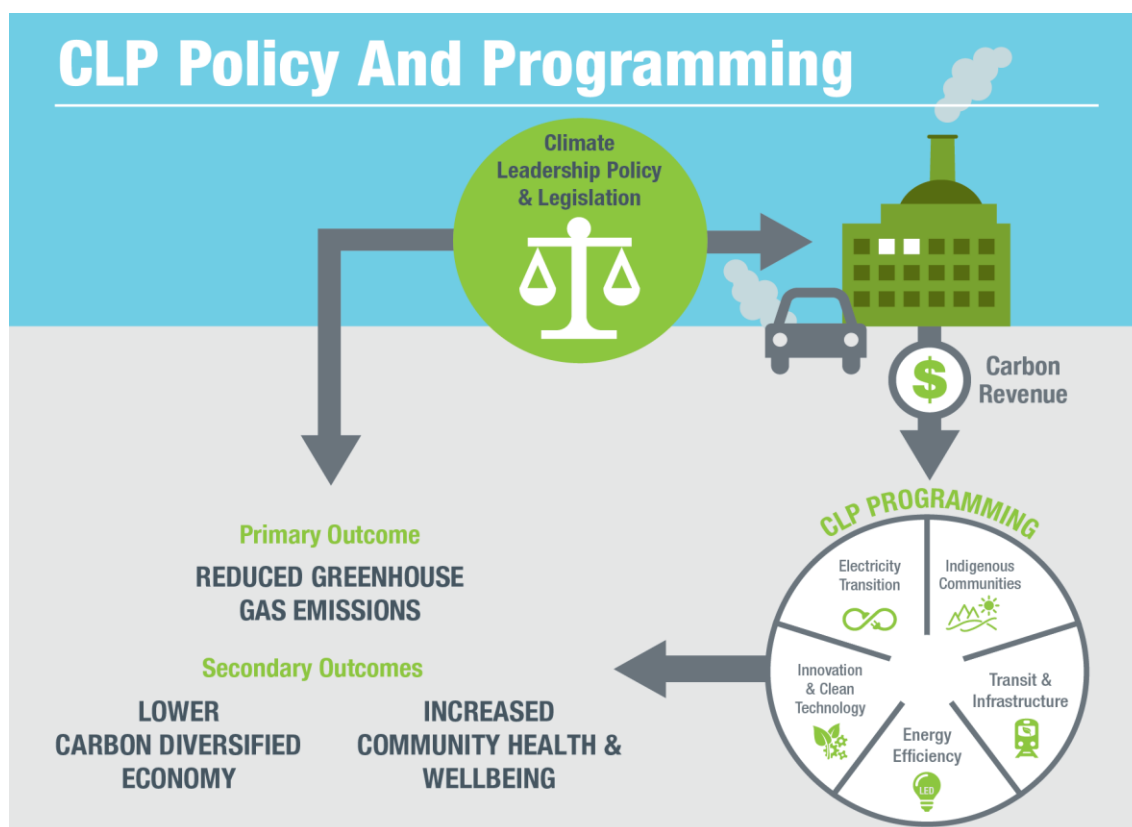
ACTION AREAS



CLP POLICIES AND PROGRAMS

Each policy and program links to one or more of the action areas. Examples of CLP policies and programs include the Carbon Competitiveness Incentive Regulation (CCIR), the Renewable Electricity Program (REP) and the Indigenous Climate Leadership Initiative.

The relationship between CLP action areas, associated programs and ultimate outcomes is illustrated in the following figure.



How Will We Know We Are on the Right Track?

The framework described above – outcomes, action areas, and policies and programs – forms the structure for measuring and reporting progress. Indicators help monitor progress on action areas and outcomes; updates on milestones help monitor progress on programs.

Where available for each indicator, the progress summary identifies the CLP baseline, the current result, the desired result, the trend and status. Trends are calculated using reported historical and current results for each indicator. Status is calculated by projecting the CLP baseline to the target year, and then comparing that result with the target. Where there is no annual target, status is reported as Not Available.

- ▲ Positive upward trend
- ▼ Positive downward trend
- ▲ Negative upward trend
- ▼ Negative downward trend
- Steady trend
- Projected to meet or surpass target
- Projected to be near target (within 20 per cent of target)
- Projected to be off target (more than 20 per cent off target)
- Not Applicable
- NA – Not Available
- TBD – To Be Determined

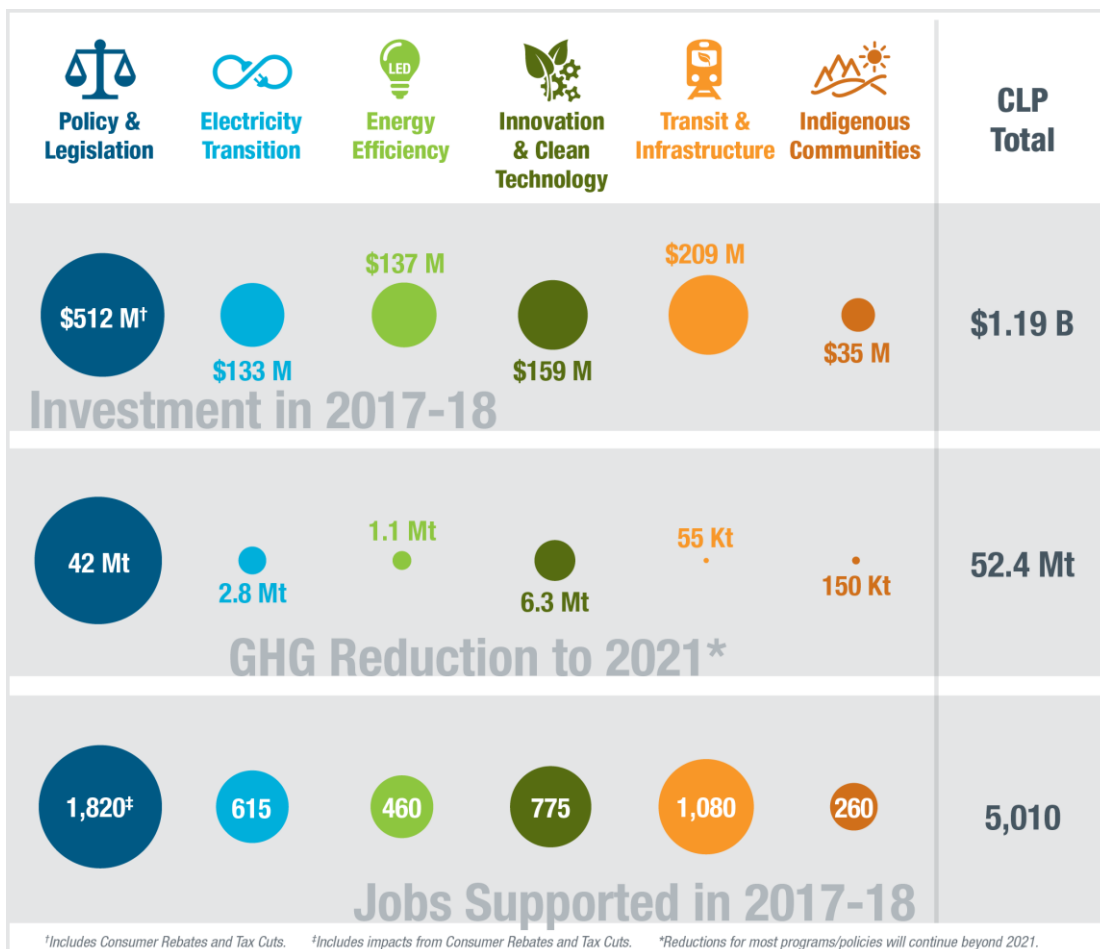
Note: Several indicators use data from Environment and Climate Change Canada's (ECCC) National Inventory Report 1990 – 2016: Greenhouse Gas Sources and Sinks in Canada. Some values from historical years have changed relative to the 2016-17 CLP Progress Report due to data updates by ECCC.

A Year in Review

In 2017-18, a total of \$1.19 billion of carbon revenue was invested back into the Alberta economy. About 40 per cent, or \$487 million, went back to Albertans as either rebates or tax cuts. The remaining 60 per cent, or just over \$700 million, was invested in more than 50 climate leadership programs and policies, with an expected impact of over 5,000 supported jobs in 2017-18 and over 52 Mt of cumulative GHG emissions reductions by 2021 (figure below).

Program highlights within each action area section reflect the tremendous work done in 2017-18.

Budgeted and actual 2017-18 investments are outlined below.



Data sources: CLP investment data - Treasury Board and Finance; estimated GHG reductions to 2021 CLP Program Reporting, Emissions Forecasting Model; jobs data - Statistics Canada Input Output Model

2017-18 Investments

2017-18 Investments (millions of dollars)	2017-18 Budgeted	2017-18 Actual
Policy and Legislation		
• CLP Delivery and Other Initiatives	45	25
• Tax Rebates and Reductions	175	181
• Household and Other Rebates	420	306
Electricity Transition	129	133
Energy Efficiency	188	137
Innovation and Technology	88	159
Transit and Infrastructure	237	209
Indigenous Communities	40	35
TOTAL CLP	1,322	1,185

Note: The 2017-18 Fiscal Plan categorized programs slightly differently than the CLP Outcome Framework. The table above reflects the CLP Outcome Framework.

The actual amounts are \$137 million lower than the total budgeted amounts. The greatest variances were in Household and Other Rebates (\$114 million less on rebates, mainly due to a timing difference in the recognition of rebates between the current and prior year, and lower rebates paid than originally anticipated) and in Innovation and Technology (\$71 million more government funding).

Actual program costs are in the program summary tables within each action area.

Looking Forward

Government expects to invest about \$2 billion of CLP funds annually over the next three years. Expected costs for 2018-21 are in the table below.

2018-21 Investments

Estimated Costs (millions of dollars)	2018-19 Estimate		2019-20 Target		2020-21 Target		3-Year Total	
Policy and Legislation								
• CLP Delivery and Other Initiatives	62		80		244		386	
• Tax Rebates and Reductions	204	802	213	811	215	965	632	2,578
• Household and Other Rebates	536		518		506		1,560	
Electricity Transition	214		228		237		680	
Energy Efficiency	214		265		183		662	
Innovation and Technology	183		192		146		521	
Transit and Infrastructure	458		555		317		1,330	
Indigenous Communities	49		49		46		145	
TOTAL CLP	1,922		2,101		1,893		5,915	

Note: The 2017-18 Fiscal Plan categorized programs slightly differently than the CLP Outcome Framework. The above table reflects the CLP Outcome Framework. For further information on future CLP investments, please see pages 35-37 of [2018-21 Fiscal Plan \(Alberta Budget 2018\)](#). Total CLP expenditures do not correspond exactly to the sums of the individual action area estimates/targets due to rounding.

Ultimate Outcomes

Reduced GHG Emissions

Total GHG Emissions

Indicator	Baseline (2015)	Result (2016)	Desired Result	5-Year Trend	Status
Total GHG Emissions (<i>Mt of carbon dioxide equivalent emissions in Alberta</i>)	267	263	Decreasing trend*	▲	NA

* compared to business-as-usual scenario (2015)

▲ Negative upward trend (over last five years)

NA – Not available (insufficient data to determine trend since 2015)

Description

Total GHG Emissions measures Mt of carbon dioxide equivalent (CO₂e) from source categories. It includes emissions from agriculture, energy, industrial processes, solvent and other product use, and waste source categories. It excludes biomass combustion, land use, land-use change and forestry. The indicator is based on an international standard (United Nations Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change) that is recognized globally as comparable and scientifically-relevant. A 16-month lag in reporting is due to validation processes and complex calculations required to derive the results. Data are from the Government of Canada's National Inventory Report, Greenhouse Gas Sources and Sinks in Canada 1990-2016 Part 3.

Importance

Alberta's CLP policies, legislation and programs all drive towards changing Alberta's emissions path. The indicator links to ECCC commitments on climate change and allows for national and global comparisons.

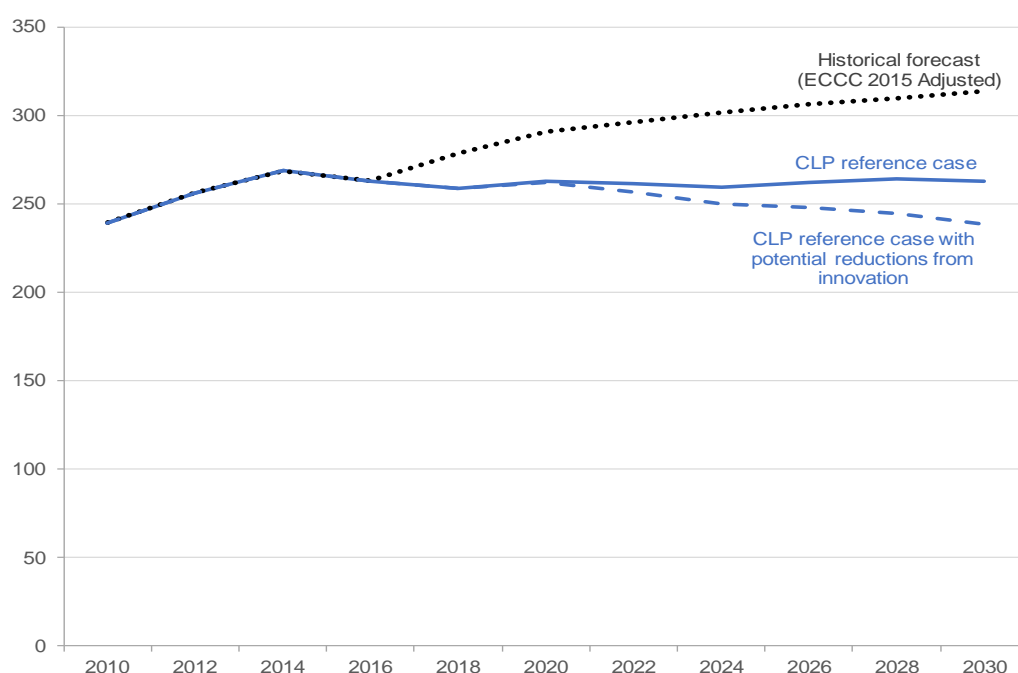
Desired Result

For reduction of GHG emissions, Alberta focuses on a suite of policy goals and measures to achieve emissions reductions (as described on page 9).

Progress

The indicator result showed a very moderate decrease of four Mt of CO₂e from 2015 to 2016. This is mainly due to decreases in electricity, upgrading, conventional oil, heavy industry, buildings and agriculture despite increases from in situ and natural gas production and processing.

Figure 1: Actual and Estimated GHG Emissions for Alberta
(Mt of CO₂e)



The CLP reference case (Figure 1, Table 1) represents current expectations for future GHG emissions based on 2018 federal and CLP climate policies, and on economic growth as projected in 2018. Emissions are forecast to decrease through 2018, then remain at about the same level even with increasing population, economic growth and oil sands production. Figure 1 and Table 1 include ECCC's 2015 historical forecast (before the CLP) that is referenced in the Climate Change Advisory Panel's Report to Government. The historical forecast is adjusted for ECCC data updates in 2018. Differences between the historical forecast and the CLP reference case include CLP's projected GHG reductions, differences in economic growth and methodologies used to project emissions. The CLP reference case with potential reductions from innovation (Figure 1, Table 1) includes estimates of reductions funded through the CLP, but innovative technologies and processes make the projected reductions less certain.

Table 1: Actual and Estimated GHG Emissions for Alberta (Mt of CO₂e)

Year and Considered Policy/ Economic Expectations	Reported Results				Forecasted Results						
	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030
Historical Forecast (ECCC 2015 Adjusted)	239	256	269	263	279	291	296	301	306	310	314
CLP Reference Case	—	—	—	—	259	263	261	259	262	264	263
CLP reference case with potential Reductions from Innovation	—	—	—	—	259	262	256	250	248	245	238

Source (Figure 1 and Table 1): Reported Results (2010-2016) from 2018 National Inventory Report. ECCC. Historical Forecast based on Canada's Second Biennial Report on Climate Change, ECCC (2015) with Government of Alberta adjustments. CLP reference cases from Government of Alberta analysis.

Note: The reported results for 2010 to 2016 from the Historical Forecast are replaced by actual GHG emissions from the 2018 National Inventory Report

— Not Applicable

Figure 1, Table 1 shows the forecasted impacts on GHG emissions as large industrial facilities respond to carbon competitiveness incentives, a carbon price of \$30 per tonne and expiry of the carbon levy exemption for upstream oil and gas. Improvements in residential, commercial and institutional buildings and in transportation under the carbon levy and program incentives are expected to further reduce emissions.

Lower-carbon Diversified Economy

Indicator in Development

The CLP contributes to a lower-carbon diversified economy by investing in and incenting the development of clean technology, fostering the growth of an energy efficiency industry and transitioning to a lower-carbon electricity system. It helps municipalities and communities take action on climate change and builds Indigenous capacity to participate in Alberta's electricity market and lower-carbon economy.

This report provides results on green skills employment and jobs supported through CLP investments. Additional work in 2018-19 will identify indicator(s) to monitor progress on this longer term outcome.

Improved Community Health and Well-being

Indicator in Development

Phasing out coal emissions reduces pollutants and benefits health. Work in 2018-19 will identify indicator(s) on progress towards this outcome. The Electricity Transition section reports on coal emissions, and Alberta Environment and Parks reports on the air quality index – the percentage of good air quality days in urban areas based on ambient air quality objectives for fine particulate matter, ozone, carbon monoxide, nitrogen dioxide and sulfur dioxide.

Environmental, Economic and Social Impacts

Devastating wildfires, floods and pine beetle infestations have made us keenly aware of climate impacts on all aspects of life and society – our economy, our communities, our way of life and, clearly, our environment. The CLP's ultimate outcomes reflect this connection, and the indicators will help monitor progress.

While the CLP Progress Report provides an annual update, the broader impact takes time. Government will evaluate the CLP's environmental, economic and social impacts in a three-to-five year time period.



Policy and Legislation

Policy and legislation are the Government of Alberta's (GoA) key tools to enable program delivery that encourages behaviour changes for a lower-carbon and diversified economy. This action area demonstrates leadership while recognizing the significant implications of climate policies. It will contribute about 80 per cent of expected emissions reductions by focusing on these objectives:

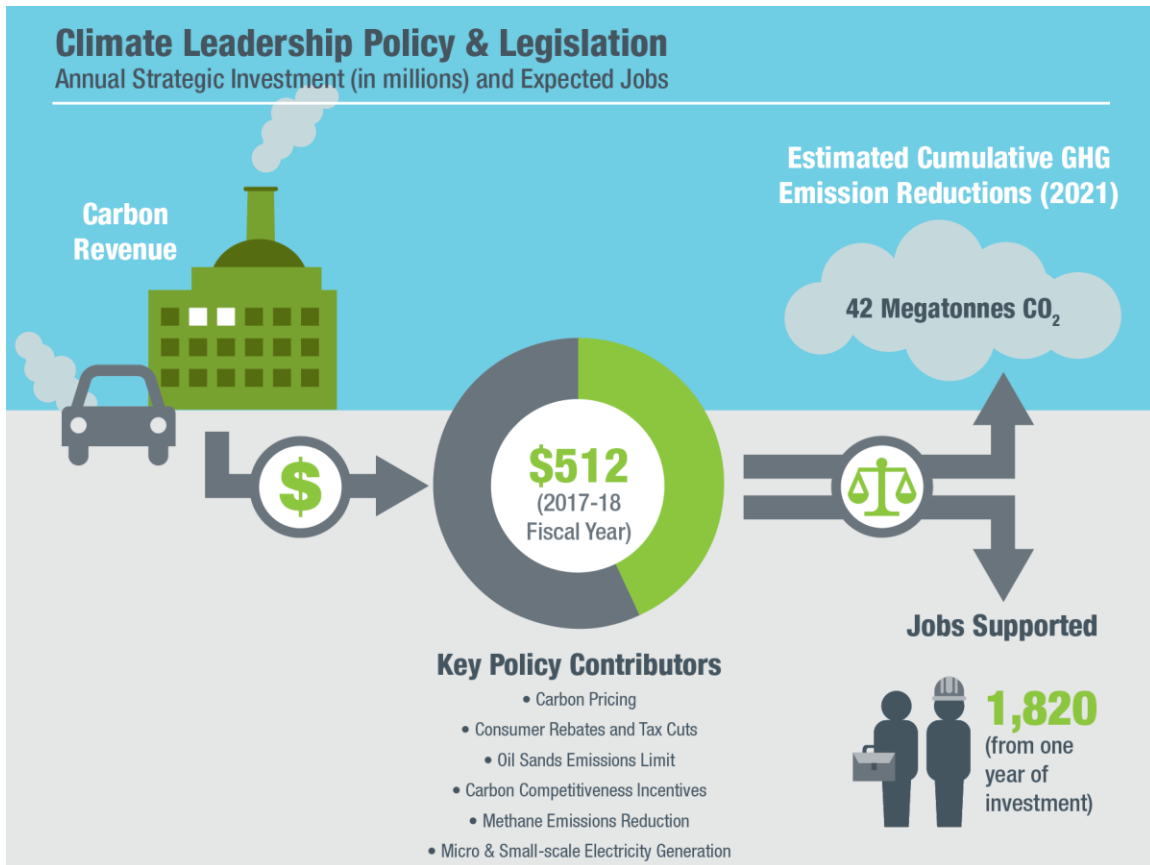
Objectives

- **Incent and enable emissions reductions using consistent, integrated and predictable approaches.**
 - Policy suite includes carbon pricing, oil sands emissions limit, a methane emissions reductions goal and complementary legislation.
- **Reduce GHG emissions in Alberta, specifically from regulated sectors, while maintaining competitiveness.**
 - Policy goal is a 45 per cent reduction in methane emissions from oil and gas operations by 2025 (from 2014 levels).
 - Policy goal is to limit oil sands GHG emissions to less than 100 Mt in any year.
- **Ensure a collaborative approach to the design and application of policy and legislation.**
 - Regulatory alignment and/or equivalency with cross-jurisdictional partners.
 - Industry and other regulated sectors and groups understand and comply with regulations.

We recognize Albertans are experiencing the effects of climate change in real-time. Government continues to build resiliency and prepare for the impacts of climate change.

Strategic Investments

In 2017-18, \$512 million was invested in this action area. Of this, 95 per cent went to rebates and tax cuts, the remaining 5 per cent was used to implement CLP policy and legislation to support measures including carbon pricing, methane emissions reduction, the oil sands emissions limit, and to incent carbon competitiveness. It is estimated this investment supported about 1,820 jobs and will reduce cumulative emissions by about 42 Mt by 2021.





Progress Summary

Performance Measures/Indicators	Baseline (2015)*	Result (2016)	Desired Result	5-Year Trend	Status
1. Incent and Enable Emissions Reductions					
1.1 Priced GHG Emissions (% of priced provincial CO ₂ e emissions)	46	47	60 (2017) 70 (2018)	▲	●
1.2 Schedule of Carbon Price Over Time	Table PL 1.2 Carbon Price Over Time				
1.3 Complementary Climate Change Legislation (qualitative)	Table PL 1.3 Complementary Climate Change Legislation				
2. Reduce GHG Emissions while Maintaining Competitiveness					
2.1 Commercial and Residential GHG Emissions (Mt CO ₂ e)	55.2	52.2	Decreasing trend**	▼	NA
2.2 Large Industry GHG Emissions (Mt CO ₂ e)	189	188	Decreasing trend**	▲	NA
2.3 Methane Emissions Reductions (%)	0 (2014)	TBD	45 (2025)	TBD	TBD
2.4 Oil Sands GHG Emissions (Mt CO ₂ e)	TBD	<100***	<100	TBD	● ***
3. Ensure Collaborative Approach					
3.1 Participation in Inter-governmental Efforts on Climate Change	3.1 Narrative Results				
3.2 Climate Change Regulatory Compliance Rate	TBD	TBD	TBD	TBD	TBD

* For methane emissions reductions, the baseline year is 2014.

**Compared to business-as-usual scenario (2015)

*** Though methodology has not been confirmed for this indicator, reporting through the Specified Gas Reporting Regulation indicates the current result is less than 100 Mt.

▲ Positive upward trend ▼ Positive downward trend ▲ Negative upward trend ● Projected to meet or surpass target
NA – Not Available



Progress Detail

1.1 Priced GHG Emissions

Description

Priced GHG Emissions measures progress towards pricing a broader range of provincial GHG emissions through legislation and regulations. It compares, as a percentage, the tonnes of provincial CO₂e emissions that are covered by a carbon price to the total tonnes of provincial CO₂e emissions.

Under the CLP, Alberta prices emissions through two mechanisms.

The carbon levy prices commercial and residential emissions (and some small industry) through their combustion of transportation and heating fuels (excluding certain fuels such as marked gas and diesel used on farms). Total carbon levy revenue for the reporting year is divided by the carbon levy price per tonne.

The new CCIR replaced the Specified Gas Emitters Regulation (SGER) in January 2018. It prices emissions from large industrial facilities emitting over 100,000 tonnes of GHGs per year and smaller facilities that may opt in. The CCIR is designed to maintain industry competitiveness and was designed in consultation with industry.

Total tonnes of provincial CO₂e emissions includes emissions from agriculture, energy, industrial processes, solvent and other product use, and waste source categories. It excludes emissions from biomass combustion, land use, land-use change and forestry. Data are from the Government of Canada's National Inventory Report, Greenhouse Gas Sources and Sinks in Canada 1990-2016 Part 3, which has a 16-month reporting delay. Total priced emissions are divided by total inventory emissions and reported as a percentage.

Importance

A price on carbon provides a market-based incentive for families, businesses and communities to lower their emissions and their impact on environmental and ecosystem health and integrity. Carbon pricing is internationally recognized as the most effective and efficient mechanism for reducing GHG emissions.

Desired Result

Sixty per cent of provincial CO₂e emissions by 2017, and 70 per cent by 2018.



Progress

Results from 2013 to 2016 show about 45 per cent of Alberta's emissions were priced through the former SGER, implemented in 2007. Results for 2016 show a slight increase of 1 per cent from the previous year.

The 2017 results are expected to increase priced emissions to 60 per cent, driven primarily by the carbon levy and to a lesser extent by the SGER.

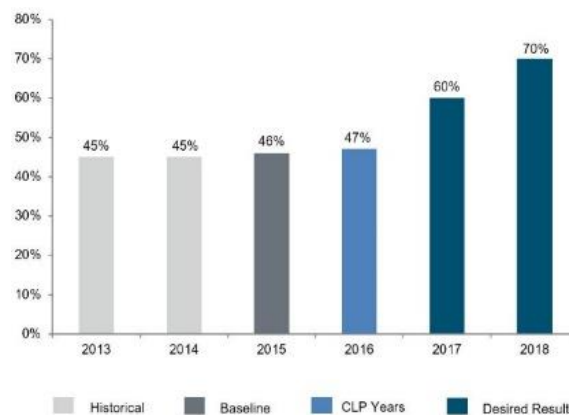
It is expected that in 2018, the new CCIR will increase the percentage of priced emissions to the 70 per cent target by including industrial process emissions, such as those from chemical reactions in the cement and minerals sectors.

Household Rebates

The GoA provides carbon levy rebates to low- and middle-income households, and uses carbon levy revenue to fund tax cuts for small businesses. Rebates help households adjust to carbon pricing and support measures to reduce their carbon footprint. Rebates are based on the previous year's tax return.

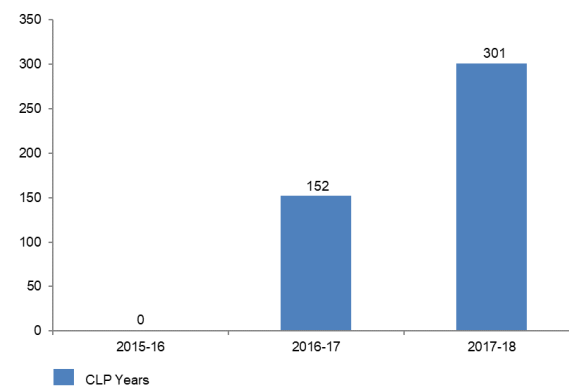
Full rebates go to single people who earn \$47,500 or less, and to couples, single parents and families who earn \$95,000 or less. Households over these thresholds may receive a partial rebate. The rebate is automatically delivered to Alberta residents who file a tax return and meet the income criteria.

Figure PL 1.1: Priced Greenhouse Gas Emissions
(% of priced provincial CO₂e emissions)



Data sources: ECCC - National Inventory Report 1990-2016: Greenhouse Gas Sources and Sinks in Canada; Alberta Treasury Board and Finance - Carbon Levy Data, Alberta Environment and Parks - Large Final Emitters data

Figure SPL 1.1.1: Household Rebates
(\$ million)



Data source: Canada Revenue Agency



Climate Leadership Household Rebates measures the total amount of rebates, in millions of dollars, over a benefit year that runs from July to June. Rebates are paid in four quarterly installments in July, October, January and April.

The data source is Treasury Board and Finance. Final 2017-18 fiscal year results are available in late 2018.

Alberta households received about \$300 million in the 2017-18 fiscal year. This is the first full benefit year, so there are no directly comparable figures. Carbon Leadership Household Rebates will give an estimated \$525 million back to Albertans in 2018-19.

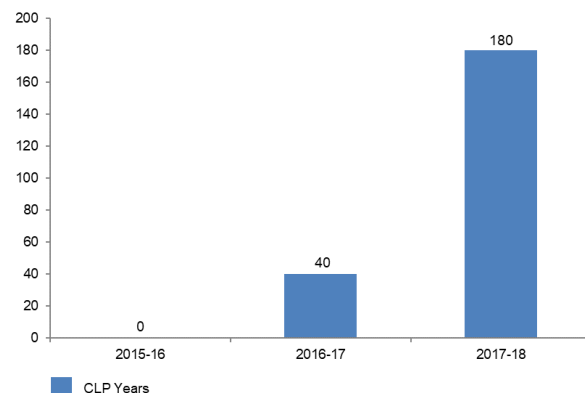
Rebate amounts increased in January 2018 with the carbon price increase from \$20 to \$30 per tonne. Quarterly payments became standard for all recipients in July 2017. Before that, payments were annual, semi-annual or quarterly, depending on the rebate amount.

Small Business Tax Reduction

Small Business Tax Reduction measures the total amount of carbon levy revenue, in millions of dollars, used to finance the small business tax cut.

To help businesses adjust to the carbon levy, Alberta's small business corporate income tax rate was reduced by one third, from three per cent to two per cent effective January 1, 2017. While the carbon levy is intended to incent behaviour change, the government is supporting small businesses as they transition to a lower-carbon economy.

Figure SPL 1.1.2: Small Business Tax Reduction (\$ million)



Data source: Alberta Treasury Board and Finance

The latest available data show \$180 million of carbon levy revenue financed the small business tax cut in 2017-18. There are no directly comparable figures, because this is the first full year of the rate reduction. The 2016-17 actual result was \$40 million, but the rate reduction was only in effect for three months of the fiscal year. It is estimated the 2018-19 result will be \$195 million.

Carbon levy revenue is also used to fund portions of the Alberta Investor Tax Credit program. Details are in the Innovation and Clean Technology Program Summary table on page 95.



1.2 Carbon Price Over Time

A carbon price is the amount charged for emitting one tonne of CO₂e into the atmosphere. Alberta has priced large industrial emissions since 2007. The CLP broadened this to an economy-wide price in 2017, because it is the most cost-effective way to reduce GHG emissions.

Table PL 1.2 Alberta's Carbon Price over Time (below) illustrates how the incentive to reduce GHG emissions has broadened and increased over time.

Year	Regulation	Price (per tonne of CO ₂ e)	Applied to
2007	SGER	\$15	Large industry
2016	SGER	\$20	Large industry
2017	SGER	\$30	Large industry
	Carbon Levy	\$20	Commercial and residential (and small industry)
2018 onward	CCIR	\$30	Large industry and smaller emitters that compete directly with regulated facilities
	Carbon Levy	\$30	Commercial and residential (and small industry)

1.3 Complementary Climate Change Legislation

The CLP includes a suite of initiatives and policies that require legislation to be implemented. Table PL 1.3 (below) identifies the statutes and regulations put in place to support the CLP in 2016, 2017 and 2018.



Statute/Regulation	What it Enables	Implementation Date		
		2016	2017	2018
<i>Energy Efficiency Alberta Act</i>	A public agency that raises consumer awareness of energy use; promotes, designs and delivers programs and activities to support energy efficiency, energy conservation, micro-generation and small-scale energy systems; and promotes development of an energy efficiency services industry.	Oct. 27		
Micro-generation Regulation (Amendment)	Micro-generation up to 5 megawatts and site aggregation.	Dec. 14		
<i>Oil Sands Emissions Limit Act</i>	Limits oil sands GHG emissions to a maximum of 100 Mt in any year with provisions for cogeneration and new upgrading capacity.	Dec. 14		
<i>Climate Leadership Act</i> and Climate Leadership Regulation	Carbon levy and approved exemptions, rebates and refunds.		Jan. 1	
<i>Alberta Personal Income Tax Act</i> (Amendment)	Alberta Climate Leadership Adjustment Rebates for lower- and middle-income Albertans.		Jan. 1	
<i>Alberta Corporate Tax Act</i> (Amendment)	Small business corporate income tax rate reduction.		Jan. 1	



<i>Renewable Electricity Act</i> and amendments to: <ul style="list-style-type: none"> • <i>Alberta Utilities Commission Act</i> • <i>Electric Utilities Act</i> • <i>Environmental Protection and Enhancement Act</i> • <i>Hydro and Electric Energy Act</i> 	Renewable electricity target of 30 per cent of electricity from renewable energy sources by 2030, and REP.		Mar. 31	
CCIR	<p>The CCIR replaced the SGER on January 1, 2018.</p> <p>This transitioned from the facility-based approach to an output- or product-based approach that rewards facilities with best-in-sector performance, encourages innovation, and maintains industry competitiveness in a low-carbon global economy.</p> <p>Eligible facilities that emit less than 100,000 tonnes, but face high carbon costs and vulnerability to competitive market conditions, may opt in.</p> <p>The CCIR was amended June 1, 2018, to provide compliance cost relief (additional compliance flexibility and free allocations) to those who qualify for cost containment.</p>			<p>Jan.1</p> <p>Jun. 1</p>

In addition to the legislation that was already implemented to support the CLP (Table PL 1.3), other legislative initiatives are underway:

Methane Emissions Reduction: Developing and enhancing regulatory standards for leak detection and repair, monitoring and reporting methane emissions, and requirements for new and existing facilities. This is necessary to reduce methane emissions from the oil and gas sector by 45 per cent from 2014 levels by 2025. Finalized Alberta Energy Regulator (AER) directives are expected in 2018 for phase-in between 2020 and 2023.



Oil Sands Emissions Limit Regulation: The oils sands emissions limit was passed into law through the Oil Sands Emissions Limit Act which received royal assent in December of 2016. The Government continues to work with industry to develop a regulation to implement the 100 Mt oil sands limit with provisions for cogeneration and new upgrading capacity. The Oil Sands Advisory Group's (OSAG) advice to government on implementing the limit was released on June 16, 2017.

Small-scale and Community Generation: Developing a new regulation to enable small-scale and community generation.

2.1 Commercial and Residential GHG Emissions

Description

Commercial and Residential GHG Emissions measures the total Mt of CO₂e emissions from sectors that pay the carbon levy on transportation and heating fuels. Emissions intensity divides the emissions in tonnes of CO₂e by gross domestic product (GDP) – in real 2007 dollars to account for inflation. A 16-month reporting delay means 2017 results are not available until April 2019. Data are from the ECCC National Inventory Report 1990 – 2016: Greenhouse Gas Sources and Sinks in Canada with GDP data from Statistics Canada (CANSIM Table 36-10-0402-01).

The measure excludes large industrial sector emissions and sectors that are excluded from the carbon levy; their emissions are subtracted from Alberta's emissions total.

Importance

The CLP broadens and increases the financial incentive to reduce GHG emissions. In 2017, carbon pricing was extended to apply beyond large industrial facilities by applying the carbon levy to transportation and heating fuels. Commercial and Residential GHG Emissions shows if the incentive to change behaviour is working.

Desired Result

Decreasing trend in GHG emissions.

Progress

Annual commercial and residential emissions over five years are shown in Figure PL 2.1. There is

Figure PL 2.1: Commercial and Residential GHG Emissions (Mt of CO₂e emissions)

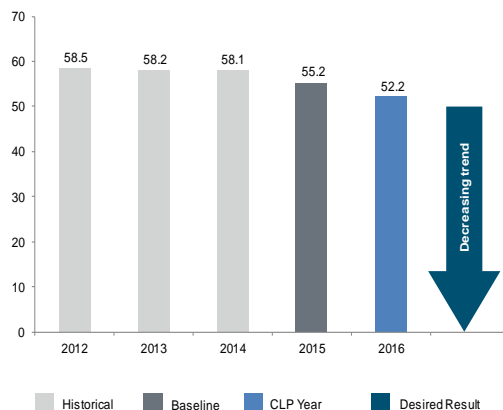
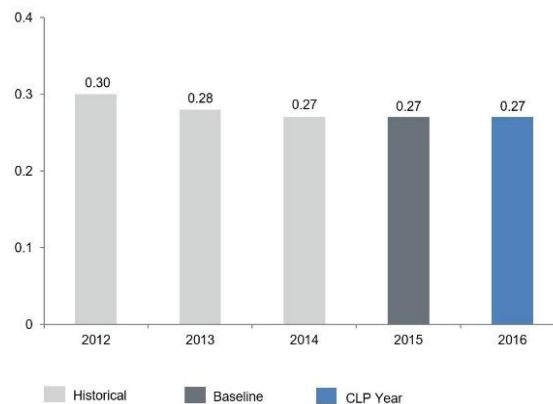


Figure PL 2.1.1: Commercial and Residential GHG Emissions Intensity (tonnes CO₂e/\$1000)



Data sources: ECCC - National Inventory Report 1990-2016: Greenhouse Gas Sources and Sinks in Canada; Statistics Canada CANSIM Table 379-0030

an increasing trend in emissions over 10 years that stabilized at about 58 Mt between 2012 and 2014, followed by decreases of 2.9 Mt in 2015 and 3.0 Mt in 2016.. In general, the emissions reflect sectors' economic performance and are expected to respond more consistently to the carbon price in future years. Figure PL 2.1.1 shows the emissions intensity of the residential and commercial sectors, with emissions per \$1,000 of economic activity (in GDP terms) remaining at 0.27 tonnes in 2015 and 2016.



2.2 Large Industry GHG Emissions

Description

Large Industry GHG Emissions measures the total Mt of CO₂e emissions from the oil and gas, electricity and heavy industry sectors, which are among the highest emitting. Heavy industry includes mining, pulp and paper, chemicals and fertilizers. Emissions intensity divides the emissions in CO₂e tonnes by GDP (in real 2007 dollars to account for inflation). Data for 2017 are not available until April 2019 as there is a 16-month reporting delay. Data are from the ECCC National Inventory Report 1990-2016: Greenhouse Gas Sources and Sinks in Canada with GDP data from Statistics Canada – Canadian Socio-Economic Information Management System (CANSIM) Table 36-10-0402-01.

Importance

This indicator helps determine how the industrial emissions pathway is being altered as a result of CLP policies and legislation and, in particular, carbon pricing.

Desired Result

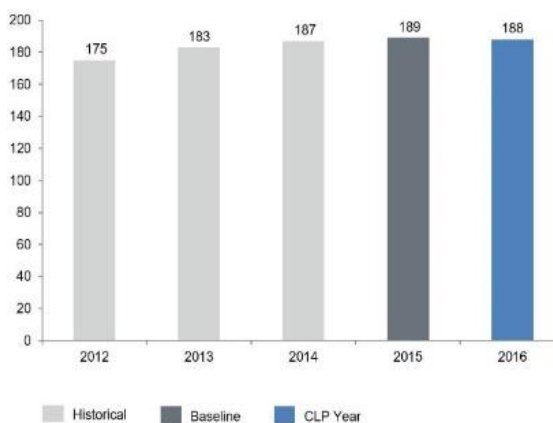
Decreasing trend in GHG emissions.

Progress

Large industry emissions were 188 Mt of CO₂e in 2016 (a modest decrease of 1 Mt compared to 2015). The five-year trend for this indicator continues to reflect flattening of emissions in the years 2014 to 2016, compared to the earlier increasing trend from 2012 to 2014.

Figures PL 2.2.1, PL 2.2.2 and PL 2.2.3 show emissions intensity for oil and gas increased slightly in 2016 from 2015; this was offset by reductions in electricity and heavy industry.

Figure PL 2.2: Large Industry Emissions (Mt CO₂e from oil and gas, electricity and heavy industry sectors)



Data source: ECCC - National Inventory Report 1990-2016: Greenhouse Gas Sources and Sinks in Canada

Changes in climate policy for large industry in 2017 and 2018 are expected to further reduce emissions intensities over time by encouraging the uptake of less carbon-intensive technologies.



Figure PL 2.2.1: Oil and Gas Emissions Intensity (tonnes/\$1000)

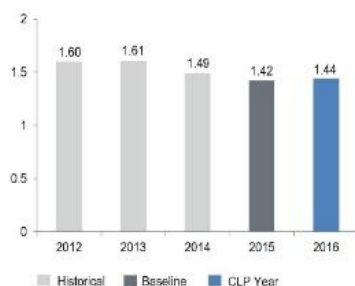


Figure PL 2.2.2: Electricity Emissions Intensity (tonnes/\$1000)

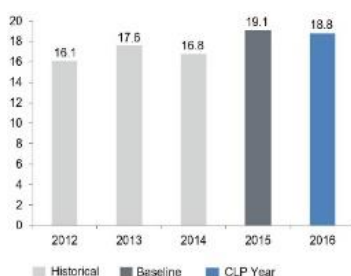
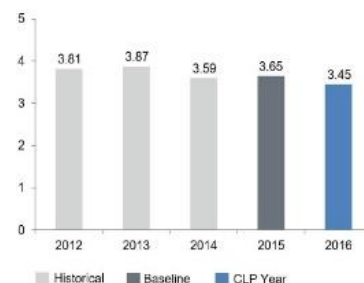


Figure PL 2.2.3: Heavy Industry Emissions Intensity (tonnes/\$1000)



Data source: ECCC - National Inventory Report 1990-2016: Greenhouse Gas Sources and Sinks in Canada; Statistics Canada CANSIM Table 36-10-0402-01.

2.3 Methane Emissions Reductions

Methodology in Development

Methane is one of the most potent GHGs, with a climate change impact 25 times greater than CO₂ over a 100-year period¹.

Alberta is targeting a 45 per cent reduction in methane emissions from upstream oil and gas operations (excluding oil sands mining) from 2014 levels by 2025. This is a key policy goal for a cost-effective means to achieve significant GHG emissions reductions. While work is under way to reduce methane emissions, the conventional oil and gas sector is exempt from the carbon levy until 2023. The Methane Emissions Reduction Initiative will measure reductions compared to the 2014 baseline year. One challenge is the limited availability of verifiable data and information. A necessary step is a new reporting system with higher quality methane emissions data, such as better emissions quantification, reporting and leak detection. A more effective monitoring system will also better inform approaches to capture emissions.

Data for Methane Emissions Reductions will come from the new measurement, monitoring and reporting system that will capture methane emissions data from upstream oil and gas facilities.

Alberta will achieve the 2025 target by:

- Improving measurement and reporting.

¹<https://www.epa.gov/ghgemissions/overview-greenhouse-gases#methane>



- Developing new leak detection and repair requirements.
- Phasing in regulatory measures for new and existing facilities between 2020 and 2023, with a mandatory regulatory review by 2022, based on actual data from the first two years for optimal and efficient regulatory measures going forward.
- Using carbon pricing mechanisms to reduce GHG emissions, including methane.
- Incenting early action through Alberta's Emission Offset System.

2.4 Oil Sands GHG Emissions

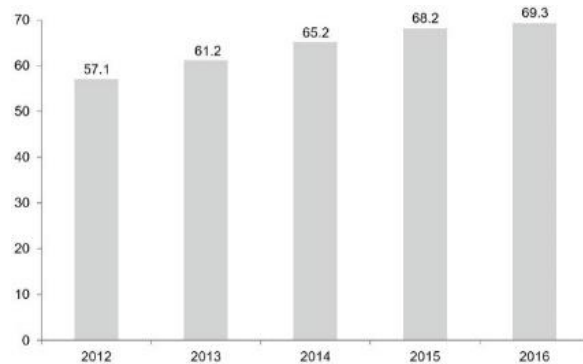
The oil sands sector accounts for roughly one quarter of Alberta's annual emissions, emitting 69.3 Mt in 2016. Passed in December 2016, the *Oil Sands Emissions Limit Act* responded to joint recommendations by Canadian and international leaders in the oil sands and the environment. This first-ever limit increases the incentive to drive technological progress and gives operators the time to develop and implement new technology to help reduce Alberta's overall emissions trajectory.

Oil Sands GHG Emissions will track Alberta's emissions under the 100 Mt limit. The methodology for this measure will be developed according to policy decisions under the *Oil Sands Emissions Limit Act*.

In June 2017, the Alberta government publicly released an OSAG report with recommendations on implementing the 100 Mt emissions limit. The group's members are from industry, regulators, environmental organizations, and Indigenous, Métis and non-Indigenous communities. In fall 2017, the government held stakeholder consultations on the recommendations through in-person information sessions, webinars and online questionnaire submissions that will inform policy development.

Figure PL 2.4 provides oil sands GHG emissions from the ECCC 1990-2016 National Inventory Report.

Figure PL 2.4: Oil Sands GHG Emissions (Mt of CO₂e)



Data source: ECCC - National Inventory Report 1990-2016: Greenhouse Gas Sources and Sinks in Canada

3.1 Participation in Inter-governmental Efforts on Climate Change



Alberta continues to work with its federal, provincial and territorial (FPT) counterparts to share, align and advance climate policies; share Alberta's experience and expertise; and learn best practices. These efforts include participation in the Canadian Council of Ministers of the Environment working groups, which include (but are not limited to) the Metrics and Indicators Project Team, Infrastructure Resilience Project Team, International Mitigation Project Team, Offsets Project Team, Emissions Projections Project Team, Adaptation Policy Committee, FPT Government Leadership Team, and the Inventories Project Team.

3.2 Climate Change Regulatory Compliance Rate

A common measure of compliance across all climate regulations will be developed once climate leadership regulations are fully defined and implemented.



Policy Results

Carbon Pricing	
Milestones	Next Steps
<p>Implemented increase in carbon levy from \$20 to \$30 per tonne.</p> <p>Delivered carbon levy rebates to low- and middle-income households and supported small business tax cuts.</p> <p>Implemented the CCIR replacing the SGER.</p>	<p>Ongoing implementation.</p>
CCIR	
Milestones	Next Steps
<p>Held technical workshops with industry groups on the design and thresholds for the new approach.</p> <p>Engaged third-party technical experts and completed competitiveness assessment in collaboration with stakeholders and Alberta Climate Change Office staff.</p> <p>Established the CCIR, which enables a transition from regulating facilities based on their own historical performance, to regulations that benchmark emissions performance across all facilities producing the same product(s), to incent higher performance among peer facilities in each sector. This encourages all facilities to adopt best-in-class technologies, while providing competitive protection to industry and recognizing best performers in a more meaningful way.</p> <p>Established measures and support to provide relief (compliance flexibility, priority for industrial energy efficiency grant funding and additional free allocations) to regulated facilities to maintain competitiveness.</p>	<p>Work with industry to collect data and develop product benchmarks for natural gas processing and multiproduct chemical sectors.</p> <p>Provide \$1.4 billion in funding over seven years to support oil sands innovation and innovation across sectors, industrial energy efficiency, bioenergy and green loans.</p>



Oil Sands Emissions Limit	
Milestones	Next Steps
<p>Received OSAG Recommendations Report on implementing the oil sands emissions limit.</p> <p>Consulted on OSAG recommendations with industry, environmental non-government organizations, academia, municipalities, and First Nations and Métis communities through in-person information sessions, webinars and online questionnaires.</p>	<p>Government will continue development of its implementation approach for the oil sands emissions limit.</p>
Methane Emissions Reduction	
Milestones	Next Steps
<p>The GoA and the AER, with advice from the multi-stakeholder Methane Reduction Oversight Committee, released draft enhancements to the following directives for public feedback:</p> <ul style="list-style-type: none"> • Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting. • Directive 017: Measurement Requirements for Oil and Gas Operations. <p>The draft enhancements were updated based on the public feedback and decisions from the GoA.</p> <p>Alberta Energy continued to assess early action opportunities to reduce methane emissions.</p> <p>The GoA continued to engage with ECCC on its planned federal methane regulation to ensure Alberta's approach is on a path to secure equivalency, keeping regulatory control in Alberta's hands.</p>	<p>Enhanced Directives 060 and 017 and associated rule changes receive AER and GoA approvals (expected late 2018).</p> <p>Release final requirements in the fall of 2018 for phase-in between 2020 and 2023.</p> <p>Alberta Energy will continue to assess early action opportunities to reduce methane emissions that complement the directives.</p> <p>Ongoing engagement with ECCC.</p>
Micro, Small-scale and Community Generation	
Milestones	Next Steps
<p>Micro-generation:</p> <p>Amended the Micro-generation Regulation to clarify the role of Regulated Rate Option (RRO) providers and how</p>	<p>Develop a new regulation to enable small-scale and community generation.</p>



the RRO price ceiling applies to credits earned by micro-generators.

Small-scale and Community Generation:

Engaged with stakeholders on potential legislation and programming options to enable community generation.

In addition to these primary CLP policies the following rebate and tax cut initiatives are funded based on policy decisions.

Household Rebates (\$301 million)

Milestones	Next Steps
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Details are reported under PL 1.1 Priced GHG Emissions.

Small Business Tax Reduction (\$180 million)

Milestones	Next Steps
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Details are reported under PL 1.1 Priced GHG Emissions.

Greenhouse Natural Gas Rebate Program (\$1.9 million)

Provides eligible greenhouse operators with a grant equal to 80 per cent of the carbon levy they pay on crop production-related heating. Supports 140 greenhouse operators, representing over 340 production acres.

Milestones	Next Steps
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Supported participants in accessing energy efficiency/renewable energy programs to save on levy and achieve energy savings. Associated milestones include:

Nine energy assessments completed.

Seven renewable energy technologies installed.

Over 30 per cent of applicants reported spending over \$5,000 on energy efficiency projects.

Review program and identify next steps.

Lloydminster Border Community Competitiveness Program (\$3 million)



Provides a grant to eligible retail fuel dealers in Lloydminster so their fuel prices can compete with Saskatchewan-based retailers in the community.

Milestones	Next Steps
Ongoing issuing of grants on a monthly basis to 11 registrants representing 15 fuel stations.	Ongoing review of need and implementation as required.

Electricity Transition

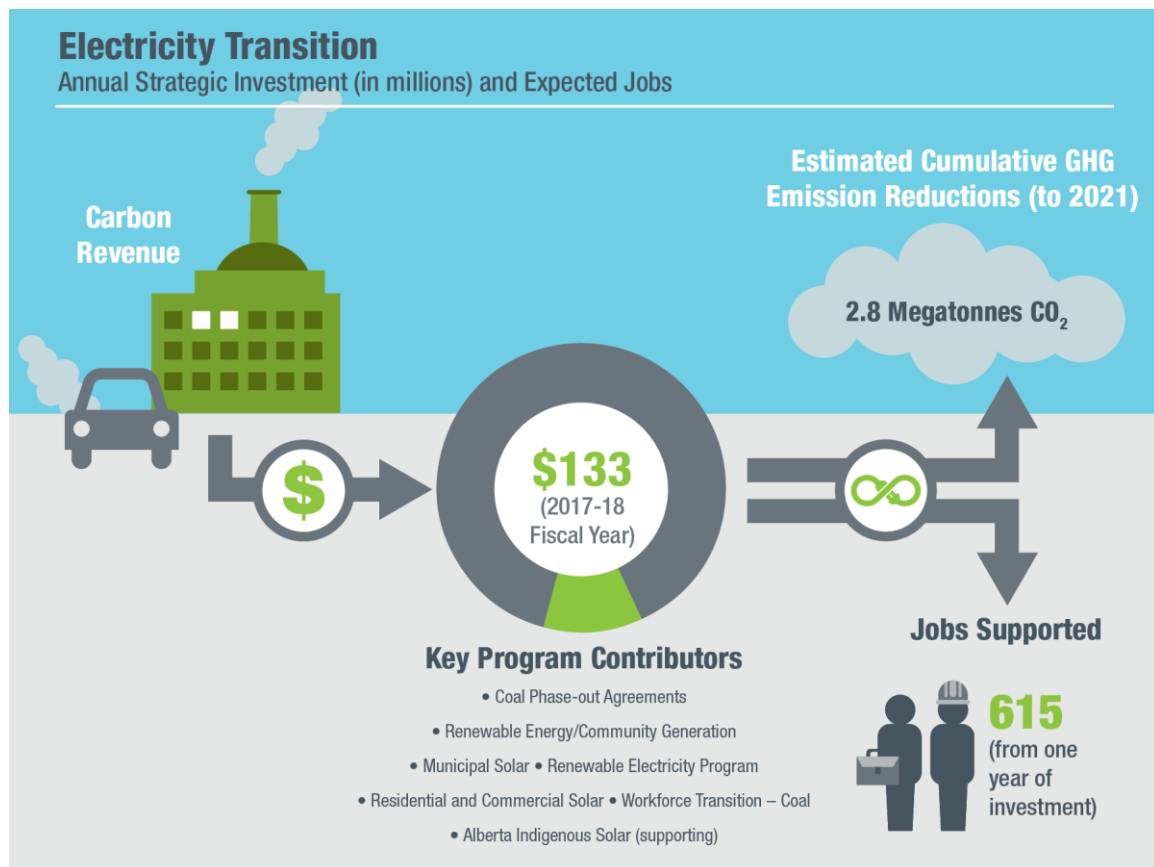
Objectives

Alberta is committed to increasing renewable energy sources for a cleaner electricity system that eliminates pollution from coal-fired generation. Approximately 97 million went toward supporting the coal transition. Renewable energy programs, policies and investments are designed to achieve the following results:

- **Transition electricity to a cleaner electricity system.**
 - Policy Goal: 30 per cent electricity generated from renewable sources by 2030.
- **Reduce GHG emissions through electricity transition.**
 - Policy Goal: zero emissions from coal-fired electricity generation by 2030.
- **Maintain a reliable, cost-effective electricity system.**
 - Protect families, farms and small businesses from high electricity prices through a four-year price ceiling.

Strategic Investments

In 2017-18, government invested \$133 million to support renewable energy programs including Community Generation, Municipal Solar, Renewable Electricity and the coal emissions phase-out. This investment supported about 620 jobs and is expected to result in 2.8 Mt of cumulative GHG emissions reductions by 2021.



Progress Summary

Performance Measures/Indicators	Baseline (2015)	Result (2017)	Desired Result	5-year Trend	Status
1. Electricity Transition					
1.1 Renewable Electricity Generation (per cent of electricity generated from renewable sources)	9.45*	9.91*	30 (2030)	▲	NA
2. Reduced GHG Emissions					
2.1 Coal-fired Generation Emissions (Mt of CO ₂ e emissions)	40.7	38.6	0 (2030)	▼	NA
2.2 Electricity System Emissions Intensity (grams of CO ₂ e emissions per kilowatt hour)	800	760 (2016)	Decreasing trend	▼	●
2.3 Renewable Energy Emissions Reductions (Mt of CO ₂ e emissions)	4.55**	4.96**	Increasing trend	▲	●
3. Reliable, Affordable Electricity System					
3.1 RRO Price Ceiling Program Application (# of months program applied) ***	—	0	—	NA	—

* A more comprehensive methodology is being examined, and subsequent reported results will change accordingly.

** 2016-17 CLP progress report results were inaccurate due to a transcription error and are corrected in this report.

*** RRO price ceiling program is in effect from June 1, 2017, to May 31, 2021. Therefore, baseline measurement in 2015 is not applicable, and as electricity prices are not controlled by government, a desired result is also not applicable.

▲ Positive upward trend

▼ Positive downward trend

● Projected to meet or surpass target

NA – Not available

— Not Applicable

Progress Detail

1.1 Renewable Electricity Generation

Description

Renewable Electricity Generation measures the total megawatts (MW) of electricity generated from renewable sources as a percentage of all electricity generated. Renewable sources include hydro, wind, biogas, biomass, solar and geothermal. The share of renewable energy is determined from generator statistics and includes distributors that have a grid-connected capacity of 500 kilowatts or more. These numbers are collected and reported annually by the Alberta Utilities Commission. Government is exploring options to better capture all renewable generation sources under the *Renewable Electricity Act*. The Alberta Electric System Operator (AESO) reports on the number of micro-generation sites and installed capacity on a quarterly basis.

Importance

Moving away from coal-fired electricity towards renewable energy sources is a key pillar of the CLP. Increasing renewable electricity generation will help Alberta reduce its GHG emissions.

Desired Result

Generate 30 per cent of electricity from renewable sources by 2030.

Progress

Under the *Renewable Electricity Act*, at least 30 per cent of annual electric energy will come from renewable energy resources by 2030. The REP encourages development of 5,000 MW of renewable electricity generation by 2030. The AESO implements and administers the program through a series of competitions to procure renewable attributes for electricity generation.

Round Two and Round Three of the REP opened in March 2018 and run concurrently. Round Two has a target of 300 MW and includes an Indigenous equity requirement. Round Three has a target of 400 MW

Figure RE 1.1: Renewable Electricity Generation
(% of electricity generated from renewable sources)



Data source: Alberta Utilities Commission

and will mimic the design and process of Round One. Successful projects for Rounds Two and Three are expected to be announced by the end of 2018.

Round One was announced in March 2017 and successfully concluded in December 2017. Three companies have been chosen in the opening round of the Renewable Electricity Program, which will result in about \$1 billion of private-sector investment in green power generation in Alberta. Its weighted average price of 3.7 cents per kilowatt hour (KWh) set a record for the lowest renewable energy pricing in Canada, and one of the lowest in North America. Significant progress on deploying renewables is expected, and projects are scheduled to come online in 2019.

Additional CLP funding programs and other initiatives will help achieve this target.

2.1 Coal-Fired Generation Emissions

Description

Coal-Fired Generation Emissions measures total GHG emissions in Mt of CO₂e from coal-fired power plants. It is a sum of the facility-measured direct, indirect and industrial process emissions reported under annual SGER compliance reports.

Importance

Ending coal pollution is a key pillar of Alberta's CLP. Alberta produces more GHG emissions from coal-fired electricity generation than the rest of Canada combined. Coal-fired plants are also a major source of non-GHG air pollution such as cadmium, lead, mercury, nitrogen oxides and sulfur dioxide. Eliminating emissions from coal-fired plants and transitioning to cleaner sources of energy will help protect the environment and Albertans' health.

Desired Result

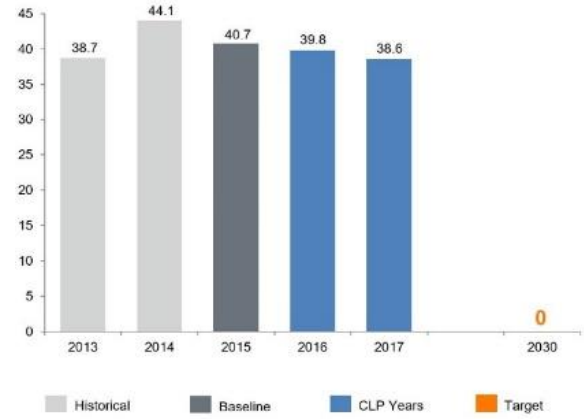
Zero emissions from coal-fired electricity generation by 2030.

Progress

Coal-fired power plants reporting under the SGER emitted 38.6 Mt of CO₂e in 2017. This is a three per cent reduction in emissions compared to 2016, driven by an overall year-over-year reduction.

Coal-fired generation emissions are expected to continue to decrease. Under federal regulations, coal-fired electricity generation will be phased out by 2030. Alberta's CLP also sets a "30 by 30" renewable energy target, in which 30 per cent of electricity used by Albertans will come from renewable sources like solar, wind and hydro by 2030, reducing coal emissions. Coal units can convert to natural gas where it is economically viable. The transition to a capacity market will facilitate private investment in technologies such as natural gas, cogeneration or other technologies.

Figure RE 2.1: Coal-fired Generation Emissions (Mt of CO₂e)



Data source: Annual SGER Compliance Reports (2011-17)

2.2 Electricity System GHG Emissions Intensity

Description

Electricity System GHG Emissions Intensity measures the total GHG emitted in grams of CO₂e for every KWh of electricity generated. Data are from the 2018 ECCC National Inventory Report, which reports on emissions, generation and intensity for facilities classified under North American Industry Classification System code 22111 – Electric Power Generation. It excludes emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and Sulfur-hexafluoride). Results from 2017 will not be available until 2019, due to a lag in data reporting.

Importance

This indicator shows how GHG emissions are changing as electricity production shifts. Ideally the intensity will decrease enough to reduce the system's total GHG emissions, even with increases in electricity production.

Desired Result

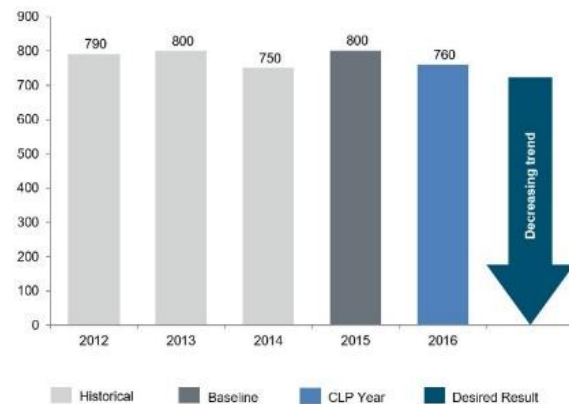
Decreasing trend in GHG emissions intensity.

Progress

Electricity System GHG Emissions Intensity in 2016 was 760 grams per KWh of electricity generated (a five per cent decrease from 2015). This trend reflects the decreasing use of coal and increasing generation from natural gas and renewables. As the impacts of CLP policies continue, especially the CCIR, emissions are expected to further decrease.

Though not yet reflected in National Inventory Report (NIR) data due to a data lag, immediate observations show coal-fired power generation decreasing and cleaner forms of electricity increasing, with a projected net decrease of seven to eight million tonnes of emissions in 2018 (based on interim compliance results under CCIR and AESO data).

Figure RE 2.2: Electricity System GHG Emissions Intensity (grams of CO₂e emissions per KWh of electricity generated)



Data source: ECCC National Inventory Report 1990-2016 – National, Provincial and Territorial Greenhouse Gas Emission Tables: Annex 13 Electricity

2.3 Renewable Energy GHG Emissions Reductions

Description

Renewable Energy Emissions Reductions measures the total GHG emissions reduced or avoided in Mt of CO₂e by transitioning to renewable energy sources. The measure is the total of annual megawatt hours (MWh) of electricity generation from hydro, wind, solar, biogas and biomass resources, multiplied by the emissions factor 0.59 tonnes per MWh. Generation data are from the Alberta Utilities Commission. The emissions factor is from the Carbon Offset Emissions Factor Handbook, Version 1, ESRD Climate Change 2015, No.1, and applies to projects displacing grid electricity with renewable energy. The calculation assumes electricity generated by renewable resources would have otherwise been supplied through a mix of coal and natural gas-fired generation.

Importance

This indicator tracks the impact of increasing renewable energy sources on Alberta's GHG emissions reductions.

Desired Result

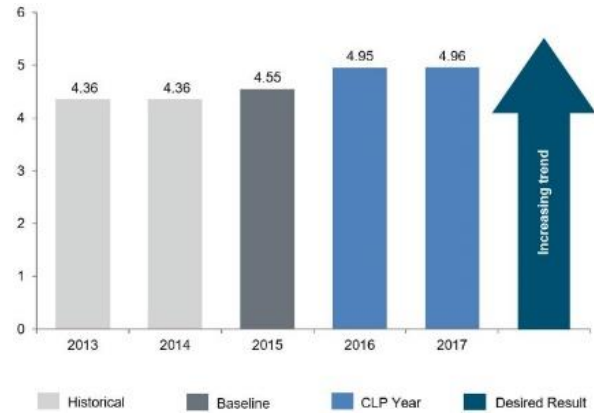
Reductions achieved by transitioning to renewable energy sources.

Progress

Over the past five years, indicator results were trending upward, based on higher renewable electricity generation. GHG emissions decrease with more renewable energy sources. While the results in 2017 are only marginally higher than the 2016 results, continued emissions reductions are expected with more renewable generation. The lag between program starts and emissions reductions is due to the time needed to install renewable capacity.

Note: There was a transcription error in CLP Progress Report 2016-17 for Renewable Energy Emissions data, corrected in this report.

Figure RE 2.3: Renewable Energy Emissions Reductions (Mt of CO₂e reduced by transitioning to renewable energy sources)



Data source: Alberta Utilities Commission, Carbon Offset Emissions Factor Handbook

3.1 RRO Price Ceiling

Description

The GoA is protecting families, farms and small businesses from high electricity prices through a four-year price ceiling of 6.8 cents per kilowatt hour on the RRO.

Consumers can choose from where they receive their electricity. This could be a competitive retailer or a RRO provider. RRO providers include Direct Energy Regulated Services, ENMAX Energy, EPCOR Energy Services, as well as rural electrification associations and municipalities. The monthly RRO rate is measured in cents per kWh for all RRO providers. The data source is the Alberta Utilities Commission.

Importance

As Alberta transitions its electricity system, it is important to monitor the effect on consumer electricity rates. The government is introducing a capacity market in part to reduce the electricity rate volatility and bring greater stability and predictability to our electricity system. The government is committed to stable and affordable prices, and applied a rate cap from June 1, 2017, to May 31, 2021. If the RRO is below 6.8 cents, consumers pay the lower rate. If the RRO

is higher, consumers will only pay 6.8 cents, and carbon revenue will pay the difference directly to RRO providers.

Desired Result

Electricity RRO consumers have stable and affordable prices from June 1, 2017 to May 31, 2021.

Progress

In 2017, the rate cap was not exceeded, so the program was not applied. The rate cap has begun to apply in some months in 2018 and will be reflected in 2018 results.

Contributing Programs

Primary	Supporting
Coal Phase-out Agreements	Alberta Indigenous Green Energy Development Program (reported on in Indigenous Communities action area)
Municipal Climate Change Action Centre (MCCAC) - Renewable Energy and Community Generation Program	Alberta Indigenous Solar Program (reported on in Indigenous Communities action area)
MCCAC - Renewable Energy for Schools	Heart Lake Lookout and Martin Fire Base Solar Program (reported on in Infrastructure and Transit action area)
REP	On-Farm Solar Photovoltaic Program (reported on in Infrastructure and Transit action area)
Residential and Commercial Solar Program (Energy Efficiency Alberta)	MCCAC - Alberta Municipal Solar Program
Workforce Transition Fund - Coal	

Program Highlights

600 MW

Of wind generation procured at record-setting price through Round 1 of the Renewable Electricity Program

11

Grants approved under Coal Workforce Transition Fund

500

Projects approved under Residential & Commercial Solar Program

13

Kilotonne CO₂e reductions from Residential and Commercial Solar Program

4,475*

Solar panels installed in Indigenous communities or organizations

* Reported on under Indigenous Communities action area

Program Results

Coal Phase-out Agreements

Provide transition payments to three companies (ATCO, Capital Power, TransAlta) for six coal-fired units that were expected to operate beyond 2030.

Estimated Cumulative Reductions to 2021	Funding
Enables GHG emission reductions through electricity transition.	\$97 Million
Milestones	Next Steps
<p>Developed off-coal agreements with the three companies.</p> <p>First annual transition payments paid.</p> <p>Progress on removing policy barriers for conversion of coal units to natural gas through ongoing collaboration with the Government of Canada and a wide range of provincial stakeholders.</p>	<p>Annual transition payment reporting and distribution of funds for 2018.</p> <p>Continue to lead discussions with coal-fired electricity generation owners, relevant agencies and stakeholders as Alberta transitions from coal to cleaner power sources.</p>

MCCAC - Renewable Energy / Community Generation Program

This program will support renewable energy and community generation, including additional support to the Alberta Municipal Solar Program (AMSP). For this reporting year, the AMSP is reported under Additional Contributors to electricity transition.

Estimated Cumulative Reductions to 2021	Funding
TBD once program design is completed for Renewable Energy/Community Generation program, and ongoing AMSP.	\$16.5 Million
Milestones	Next Steps
Initial program design.	Program implementation plan by fall/winter 2018.

MCCAC - Renewable Energy for Schools

Renewable Energy for Schools will provide funding to K-12 public school authorities to install solar PV systems on existing school facilities, with a requirement to include an educational component on climate change mitigation and renewable energy in participating schools. The program will complement existing initiatives by Energy Efficiency Alberta (EEA) and Alberta Education's Solar Technology System program.

Estimated Cumulative Reductions to 2021	Funding
TBD for Renewable Energy for Schools	\$15 Million
Milestones	Next Steps
Initial program design.	Final program design and launch by fall/winter 2018.

Renewable Electricity Program

This program encourages utility-scale renewable electricity generation to support Alberta's 30 per cent renewable electricity target. It is administered by the AESO through a series of competitions; the lowest bids get a long-term contract to buy the renewable attributes for electricity production.

Estimated Cumulative Reductions to 2021	Funding
Round One – 2.8 Mt CO ₂ e	GoA program design costs are included in Policy and Legislation. Program implementation costs are primarily covered by winning projects.
Milestones	Next Steps
<p>First competition for Round One held with a target of up to 400 MW of renewable electricity over a 20-year contract term and operational by 2019:</p> <ul style="list-style-type: none"> The AESO announced competition results that it would procure nearly 600 MW of utility-scale wind from four winning projects. Weighted average price is 3.7 cents per KWh, the lowest price for a utility-scale project in Canada and 	Successful projects for Rounds Two and Three expected to be announced by end of 2018, with an expected in-service date of June 2021.

- among the lowest ever in North America.
- Projects will be built and operational by 2019.
 - No payment occurs until projects generate electricity, and any late project is automatically penalized by losing those months in the 20-year contract.
- Rounds Two and Three announced in February opened in March 2018, and will run concurrently.
- Round Two:
- Target is for 300 MW and includes an Indigenous equity requirement.
- Round Three:
- Target is for 400 MW.
- No data will be released on participation rates for Rounds Two and Three until contracts are awarded in late 2018, to protect the integrity of the competition.

Residential and Commercial Solar Program (EEA)

This program offers a financial incentive for residential, commercial and non-profit customers to install solar photovoltaic micro-generation systems. The program encourages faster solar adoption. EEA also will provide funding to help community organizations design, build and manage community-based generation projects.

Estimated Cumulative Reductions to 2021	Funding
13,000 tonnes CO ₂ e	\$4.1 Million
Milestones	Next Steps
<p>Over 500 households and business have applied to participate.</p> <p>Full program implementation and installation is expected to result in 16 MW of new generation capacity – enough to power 2,700 homes.</p>	<p>Continue to work with and help further develop Alberta's solar industry by removing financial, administrative and technical barriers, which helps homeowners, businesses, community organizations and non-profits generate their own clean power and reduce energy costs.</p>

Workforce Transition Fund – Coal

This program provides financial assistance for re-employment, retirement, relocation and education through three program streams: Re-Employment, Bridge to Retirement and Relocation Allowance.

Estimated Cumulative Reductions to 2021	Funding
Enables GHG emission reductions through electricity transition.	\$470,000
Milestones	Next Steps
<p>Program details and applications published on website.</p> <p>Appointments set up for coal workers to submit applications at Alberta Supports Centres.</p> <p>Eleven approved Bridge to Re-Employment grants to be paid.</p>	Ongoing program delivery with \$40 million approved up to 2022-23.

Additional Contributors

The **MCCAC - AMSP** provides financial incentives to municipalities to install grid-connected solar photovoltaics on their facilities or land, and for public engagement for the project.

Milestones	Next Steps
<p>AMSP (existing): Ongoing delivery to new participants while supporting existing projects through completion, including (2017-18 results):</p> <ul style="list-style-type: none"> • 20 projects • 9 municipalities (Barrhead, Blackfalds, Brazeau County, Calgary, Edmonton, Innisfail, Raymond, St. Albert, Valleyview) • 1.65 MW of installed solar capacity • 22,277 tonnes CO₂e <p>Since program launch:</p> <ul style="list-style-type: none"> • 48 projects • 24 municipalities 	Continued delivery of program until full allocation of program funding is reached.

- 4.71 MW of installed capacity
-



Energy Efficiency

Objectives

Alberta is committed to the efficient use of its energy resources. Increased energy efficiency focuses on the following objectives:

- **Improve the energy efficiency of Alberta's homes, businesses, institutions, industries and communities.**
- **Reduce/avoid GHG emissions through decreased energy consumption and increased energy conservation.**
- **Improve Albertans' quality of life through cost savings, increased comfort and efficiencies.**
- **Foster growth of an energy efficiency industry in Alberta.**

EEA is government's primary mechanism to achieve these objectives.

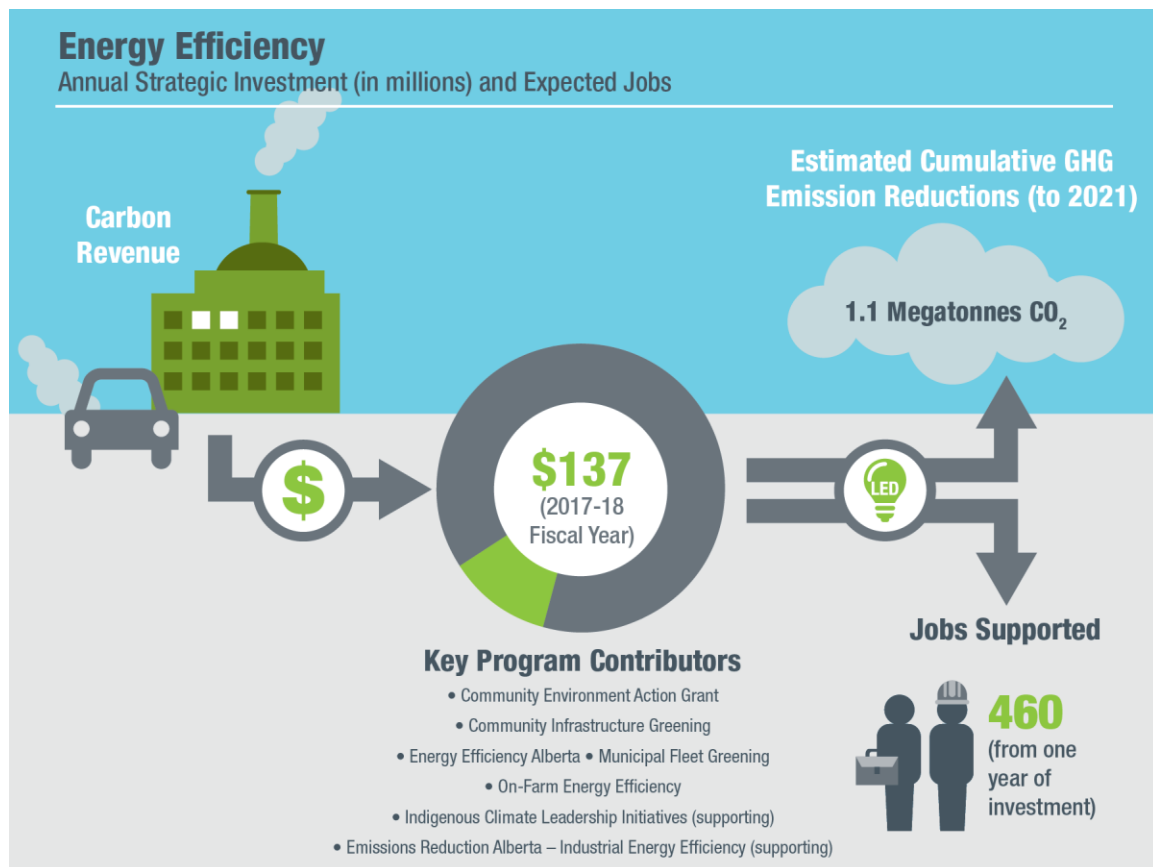
EEA also has a mandate to promote, design and deliver programs and activities to support micro-generation and small-scale energy systems in Alberta.

In its first year of operation, Energy Efficiency Alberta helped thousands of Albertans make energy-efficient choices in their homes and businesses. Details of EEA programs can be found in their 2017-18 annual report.



Strategic Investments

In 2017-18, government invested \$137 million in this action area. This investment supports EEA, the Community Environment Action Grant, Community Infrastructure Greening, Municipal Fleet Greening and On-Farm Energy Efficiency. It is estimated this investment supported about 460 jobs and will reduce cumulative emissions by 1.1 Mt by 2021.





Progress Summary

Performance Measures/Indicators	Baseline (2015)	Result (2017)	Desired Result	Trend*	Status
1. Energy Savings					
1.1 Annual Net Energy Savings (<i>gigajoules of energy savings achieved by EEA programs</i>)	0	1,460,000	Maintain or Increase	▲	●
1.2 Lifetime Net Energy Savings (<i>gigajoules of energy savings achieved by EEA programs</i>)	0	17,900,000	Maintain or Increase	▲	●
1.3 Lifetime Gross Water Savings (<i>litres of water savings from EEA Residential No Charge Program</i>)	0	7.37 Billion	Maintain or Increase	▲	●
2. GHG Emissions Reductions					
2.1 Annual GHG Emissions Reductions through Energy Savings (<i>tonnes CO₂e reductions from CLP energy efficiency programs, fiscal year</i>)	0	293,000	Maintain or Increase	▲	●
2.2 Lifetime Net GHG Emissions Reductions through Energy Savings (<i>tonnes CO₂e reductions from CLP energy efficiency programs, fiscal year</i>)	0	3,343,000	Maintain or Increase	▲	●
3. Improved Quality of Life					
3.1 Lifetime Utility Consumer Savings (<i>\$ savings resulting from EEA programs</i>)	0	330 Million	Maintain or Increase	▲	●
3.2 Customer Satisfaction Index (<i>Average scoring of customer satisfaction with Residential No-Charge Energy Savings Program, maximum score is five</i>)	—	4.65	> 4	—	●
4. Market Transformation					
4.1 Residential Energy Efficiency Trade Ally Participation (<i># of contractors and retailers engaged by EEA's residential programming</i>)	0	1,700	Maintain or Increase	▲	●

* Year over year

▲ Positive upward trend

● Projected to meet or surpass target

— Not Applicable



Progress Detail

1.1 Annual Net Energy Savings

Description

Annual Net Energy Savings is the net reduction in energy consumption under EEA programs from January 1, 2017, to December 31, 2017. Savings are expressed in gigajoules (GJ) to represent the estimated electricity and natural gas that otherwise would have been used².

Claimed³ Net Energy Savings are calculated based on the number of installations or sales of an energy efficiency measure, provided by program implementation contractors and collated by EEA staff. The calculation also includes measure-specific deemed energy savings assumptions (set of predetermined savings values from commonly accepted data sources and analytical methods) and net-to-gross ratios⁴ over the entire portfolio. These are based on 2016 program design documentation, requests for proposals and program implementation contracts.

Results are consolidated from the Residential No-Charge Energy Savings Program, the Residential Retail Products Program and the Business Energy Savings Program as of December 31, 2017.

Importance

The primary metric to determine the impact of the energy efficiency initiative and programs is energy savings. Net savings are minus what would have occurred without the program. Lower energy consumption directly leads to fewer GHG emissions and immediately lower utility bills.

Desired Result

Maintain or increase annual net energy savings.

² For this report, electricity savings have been converted into GJ and combined with natural gas savings to produce a single energy savings value.

³ Claimed savings are ex ante, results are forecasted based on energy efficiency measure installed

⁴ An 80 per cent net-to-gross ratio assumption was used for the Residential Retail Products Program, Residential No-Charge Energy Savings Program and the Business Energy Savings Program.



Progress

Energy efficiency programs will save about 1.5 million GJ of energy per year. This significant increase is due to new programs in 2017. Programming for 2018 is expected to continue this trend as more programs are introduced, including for small and medium sized industrial facilities.

1.2 Lifetime Net Energy Savings

Description

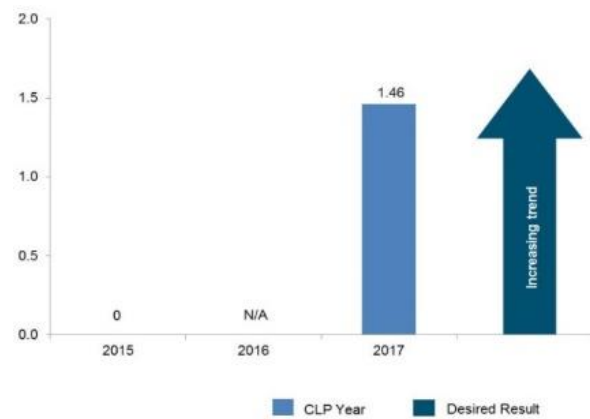
Lifetime Net Energy Savings is the total net reduction in energy consumption directly from

EEA programming over the effective lifetime of the efficiency measures. Savings are claimed for measures installed from January 1, 2017, to December 31, 2017. These savings, expressed in GJ, represent the estimated electricity and natural gas that would otherwise have been used⁵.

Claimed Net Energy Savings are calculated based on the number of installations or sales of the energy efficiency measure. Claimed net savings are provided by contractors and collated by EEA. The calculation also includes measure-specific deemed savings, net-to-gross ratios⁶ and effective useful lifetime assumptions⁷ over the entire portfolio. Deemed net energy savings and effective lifetime assumptions are based on 2016 program design documentation, requests for proposals, and program implementation contracts.

Results are consolidated from the Residential No-Charge Energy Savings Program, the Residential Retail Products Program and the Business Energy Savings Program.

Figure EE 1.1: Annual Net Energy Savings
(Million GJ)



Data source: Program implementer progress reports, 2017

⁵ For this report, electricity savings have been converted into GJ and combined with natural gas savings to produce a single energy savings value.

⁶ An 80 per cent net-to-gross assumption was used for the Residential Retail Products Program, Residential No-Charge Energy Savings Program and the Business Energy Savings Program.

⁷ Effective useful lifetime assumptions are based on weighted averages of measures installed per program.



Importance

The primary metric for energy efficiency programs is energy savings. Net savings are minus what would have occurred without the program. Lower energy consumption leads to fewer GHG emissions and immediately lower utility bills. Energy efficiency creates benefits in the initial year, and throughout the lifetime of the measure. Therefore lifetime, rather than annual, net energy savings is a more accurate estimate of efficiency program impact on emissions reduction goals.

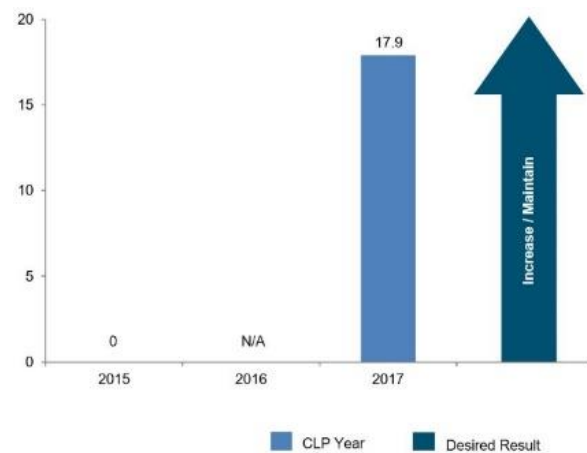
Desired Result

Maintain or increase lifetime net energy savings.

Progress

EEA's 2017 program portfolio will save about 18 million GJ over the lifetime of the installed measures.

Figure EE 1.2: Lifetime Net Energy Savings (Million GJ)



Data source: Program implementer progress reports, 2017

1.3 Lifetime Gross Water Savings

Description

Lifetime Gross Water Savings measures the decrease in water consumption directly from EEA programming over the effective lifetime of the efficiency measures. Claimed savings are from measures installed from January 1, 2017, to December 31, 2017. Savings are expressed in litres to represent the estimated water that would otherwise have been used over the measures' entire lifetime.

Sales and installation information is provided by program implementation contractors and collated by EEA staff. Deemed gross water savings and effective lifetime assumptions are based on 2016 program design documentation, requests for proposals, and program implementation contracts.



Importance

While the primary goal of energy efficiency is less energy use and fewer emissions, an important non-energy benefit is saving water. People see the benefit immediately on their utility bills. Less visible, but also significant, is the impact on emissions; water treatment and delivery is energy-intensive, so less water consumption indirectly lowers emissions.

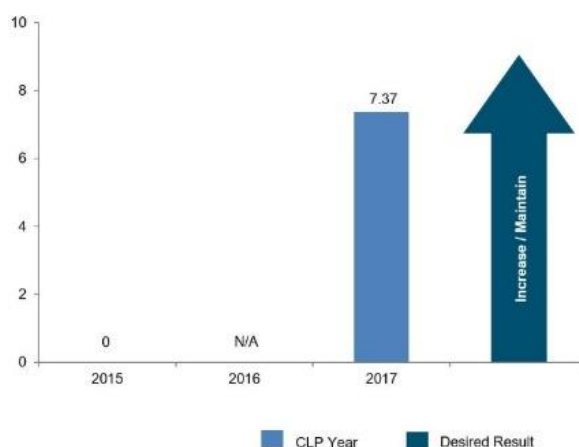
Desired Result

Maintain or increase water savings.

Progress

The 2017 result reflects gross consumer water saved as a result of the Residential No-Charge Energy Savings Program (water savings from other energy efficiency programs are not yet quantified). Estimated savings are more than seven billion litres of water over the lifetime of the measures installed in 2017.

Figure EE 1.3: Lifetime Gross Water Savings (billion litres)



Data source: Program implementer progress reports 2017

2.1 Annual Net GHG

Emissions Reductions through Energy Savings

Description

Annual Net GHG Emission Reductions through Energy Savings is the net reduction in GHG emissions that directly results from EEA and other CLP energy efficiency programming. Reductions are claimed from the fiscal year to combine all program results for the same time period. These reductions, expressed in tonnes of carbon dioxide equivalent (tCO₂e), represent the estimated emissions that are avoided.

Reductions are calculated based on claimed annual net electricity and natural gas savings and fuel-specific emission factors, combined for the entire portfolio. Results are consolidated from the Residential No-Charge Energy Savings Program, the Residential Retail Products Program and the Business Energy Savings Program, as well as other CLP programs such as On-Farm Energy Efficiency.



For EEA programs, claimed net energy savings are provided by contractors and collated by EEA staff. Fuel-specific emissions factors are sourced from the GoA Carbon Offset Emission Factors Handbook⁸.

Importance

Energy efficiency programs are powerful tools to reduce GHG emissions and can be the lowest-cost option for addressing climate change.

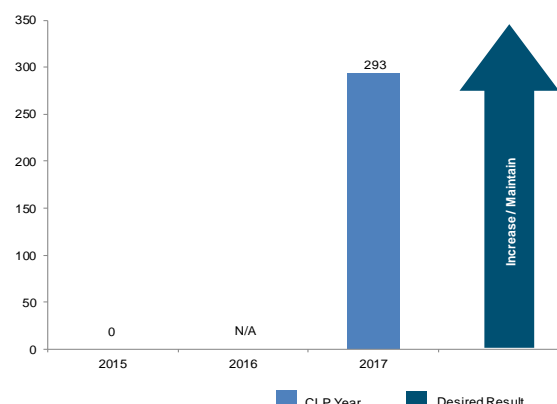
Desired Result

Maintain or increase energy savings.

Progress

Energy efficiency programs will decrease GHG emissions by 293,000 tonnes per year through energy savings. This is a significant improvement compared to previous years due to the launch of new programs in 2017. This trend is expected to continue as more programs are introduced in 2018, including programs targeting small and medium sized industrial facilities.

Figure EE 2.1: Annual Net GHG Emissions Reductions through Energy Savings (thousand tCO₂e)



Data source: Program implementer progress reports, 2017

2.2 Lifetime Net GHG Emissions Reductions through Energy Savings

Description

Lifetime Net GHG Emission Reductions through Energy Savings is the cumulative net reduction directly from EEA programming and other CLP energy efficiency programming over the effective lifetime of the efficiency measures. Reductions are claimed in the fiscal year of the program expense to combine all results for the same time period. These reductions, expressed in tCO₂e, represent estimated GHGs that are avoided.

Reductions are calculated based on claimed lifetime net electricity and natural gas savings and fuel-specific emission factors, combined for the EEA portfolio and CLP programs.

⁸ The values used are 0.64 tCO₂e/MWh (electricity) and 1,918 grams CO₂e/cubic metre (natural gas).



Claimed net energy savings for EEA programs is provided by contractors and collated by EEA staff. Effective lifetime assumptions are based on 2016 program design documentation. Fuel-specific emissions factors are sourced from the GoA Carbon Offset Emission Factors Handbook⁹.

Importance

Energy efficiency creates benefits in the initial year and throughout the lifetime of the measure. Therefore lifetime, rather than annual, net GHG reductions provide a more accurate estimate of the ultimate impact.

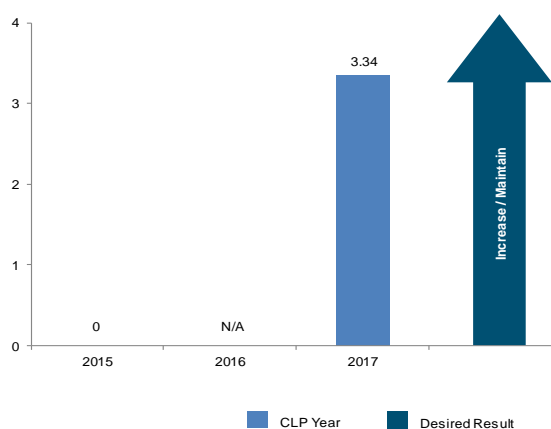
Desired Result

Maintain or increase lifetime emissions reductions.

Progress

Energy efficiency programs will save 3.34 Mt of GHG emissions through energy savings over the lifetime of the installed measures. This is a significant increase from previous years due to the launch of new programs in 2017. This trend is expected to continue as more programs are introduced in 2018, including programs targeting small and medium sized industrial facilities.

Figure EE 2.2: Lifetime Net GHG Emissions Reductions through Energy Savings (Mt CO₂e)



Data source: Program implementer progress reports, 2017

3.1 Lifetime Utility Consumer Savings

Description

Lifetime Utility Consumer Savings are customers' energy and non-energy benefits over the effective lifetime of the efficiency measures. The indicator captures the avoided energy costs and recognizes reductions in retail charges and savings from deferred transmission and distribution infrastructure. Other non-energy benefits, such as the avoided cost of incremental transmission and distribution infrastructure and system support services, reduced price volatility, and utility bill collection costs are not included at this time.

⁹ The values used are 0.64 tCO₂e/MWh (electricity) and 1,918 grams CO₂e/cubic metre (natural gas).



Benefits are claimed for measures installed from January 1, 2017, to December 31, 2017. These benefits, expressed in current-year dollars, represent the energy and infrastructure costs that would otherwise have been needed.

Savings are calculated based on claimed lifetime net electricity and natural gas savings and estimated utility system benefits, combined over the entire portfolio. Results are consolidated from the Residential No-Charge Energy Savings Program, the Residential Retail Products Program and the Business Energy Savings Program as of December 31, 2017.

This indicator should not be confused with participant bill savings, which estimates the immediate reduction in utility bill charges after adopting an energy efficiency measure.

Claimed net energy savings is provided by EEA contractors and collated by EEA staff. Forecasted electricity prices align with those used by the AESO, the natural gas price forecast is sourced from the AER, and retail charges are from the Alberta Market Surveillance Administrator and the Alberta Utilities Commission.

Importance

The benefits of energy efficiency and lower utility costs reach everyone. This indicator can increase awareness of how energy efficiency is almost always the least-cost resource. For example, energy efficiency programs can be an alternative to building new power generation and to avoid or defer transmission and distribution investments.

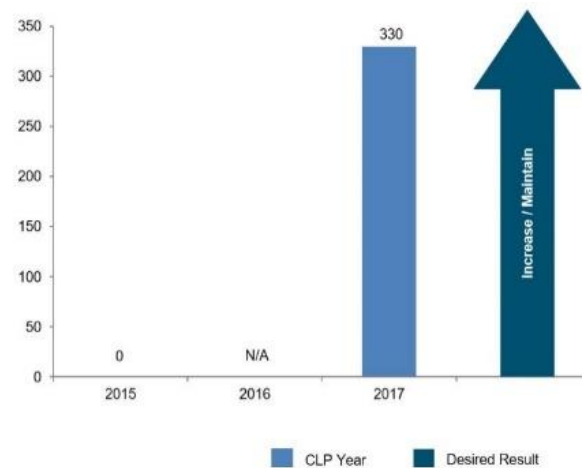
Desired Result

Maintain or increase lifetime utility consumer savings.

Progress

Utility consumer savings are expected to be about \$330 million over the lifetime of the measures installed through EEA programs in 2017.

Figure EE 3.1: Lifetime Utility Consumer Savings (\$ million)



Data source: Program implementer progress reports, 2017



3.2 Customer Satisfaction

Description

The Customer Satisfaction Index compares participant expectations with delivery of the Residential No-Charge Energy Savings Program. It tabulates participation surveys about information provided by the installer, the program registration process, quality of products/services, and staff knowledge and conduct. Results are consolidated from January 1, 2017, to December 31, 2017.

Information is provided by program implementation contractors, and is collated by EEA staff.

Importance

EEA is committed to ensuring a positive customer experience. Customer satisfaction encourages ongoing energy efficiency participation and behaviour changes, and guides future programming.

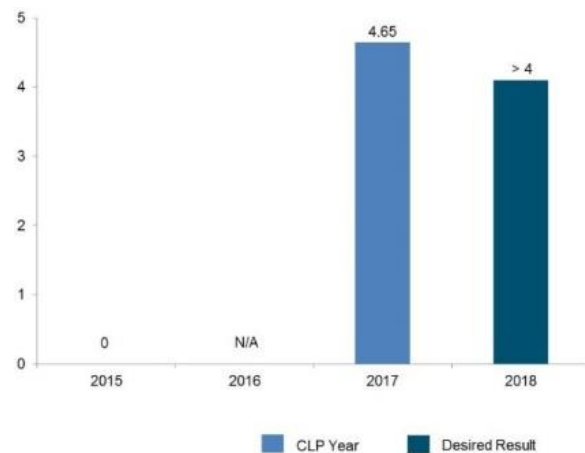
Desired Result

Customer satisfaction index greater than four out of five.

Progress

The Residential No-Charge Energy Savings Program achieved a consumer satisfaction score of 4.65 out of five. On average, participants are satisfied or extremely satisfied.

Figure EE 3.2: Customer Satisfaction Index
(scale 1 - 5)



Data source: Program implementer progress reports, 2017

4.1 Trade Ally Participation

Description

Trade Ally Participation measures the number of industry contractors and retailers in EEA's residential programming. This includes unique retail locations involved in an instant savings campaign and registered home improvement contractors.

Results are consolidated from January 1, 2017, to December 31, 2017, and specifically exclude non-residential energy efficiency and renewables trade allies.



Information is provided by EEA contractors and is collated by EEA.

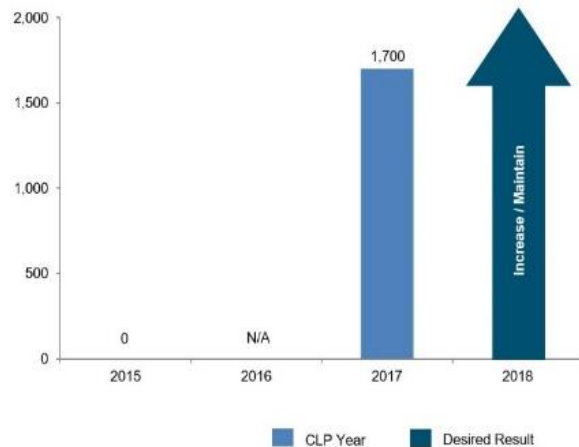
Importance

Trade ally participation is an indication of EEA's engagement with industry. This engagement is critical. Industry helps build awareness of energy efficiency and climate change as they interact with clients. Industry feedback and innovation also help improve programs. In addition, industry provides jobs, along with economic diversification and growth.

Desired Result

Maintain or increase trade ally participation.

Figure EE 4.1: Trade Ally Participation (participants)



Data source: Program implementer progress reports, 2017

Progress

Trade Ally Participation for residential energy efficiency (excluding renewables and non-residential) is 1,700 for 2017. EEA engagement with trade allies has focused on building a diverse network. In 2018-19, EEA will further develop these relationships to build capacity and foster economic growth.



Contributing Programs

Primary	Supporting
<p>Community Environment Action Grant</p> <p>Energy Efficiency Alberta</p> <ul style="list-style-type: none">• Residential Portfolio<ul style="list-style-type: none">- No Charge Energy Savings Program- Residential Retail Program• Non-Residential Portfolio<ul style="list-style-type: none">- Business Energy Savings Program- Non-Profit Energy Efficiency Transition Program• Public Awareness and Industry Training and Capacity Building <p>Farm Energy Programs</p> <ul style="list-style-type: none">• Energy Savings for Agri-Processors (small) Program• Energy Savings for Agri-Processors (large) Program• Irrigation Efficiency Program• On-Farm Energy Management Program• On-Farm Solar Photovoltaic Program <p>MCCAC - Community Infrastructure Greening</p> <p>MCCAC – Municipal Fleet Greening Program</p>	<p>Alberta Indigenous Community Energy Program (reported on in Indigenous Communities action area).</p> <p>Alberta Indigenous Energy Efficiency (Retrofit) Program (reported on in Indigenous Communities action area).</p> <p>Emissions Reduction Alberta – Industrial Efficiency Challenge (reported on in Innovation and Clean Technology action area).</p> <p>Taking Action to Manage Energy + Program (MCCAC)</p> <p>Taking Action to Manage Energy Express Program (MCCAC)</p>



Program Highlights

27,000 tonnes

Annual GHG emission reductions from products installed in 2017-18 in Non-Residential Energy Efficiency Programs

152

Energy efficiency audits completed for non-profit and volunteer-based organizations

9 Million

Energy efficiency products purchased through two EEA Instant Savings Programs

20,000

Albertans reached through activities of Community Environment Action Grant recipients

357

Grants paid to farmers and ranchers to improve on farm energy efficiency



Program Results

Community Environment Action Grant

This program provides grants to non-profit groups to design and deliver evidence-based education to help Albertans, young and old, rural and urban, understand and address climate change.

Estimated Cumulative Reductions to 2021	Funding
Enables GHG emissions reductions through funding to enhance climate literacy and support Albertans in the transition towards a lower-carbon economy.	\$2.5 Million
Milestones	Next Steps
<p>Approved 26 grant agreements.</p> <p>The Alberta Climate Change Office hosted a curriculum-focused project planning session drawing 39 participants from 17 organizations.</p> <p>Reached over 20,000 Albertans through the activities of grant recipients.</p> <p>Four projects completed.</p>	<p>Continued delivery of program and support of existing project recipients and their respective projects (22).</p> <p>Create recipient profiles to document project overviews and upcoming initiatives/events.</p> <p>Support additional networking amongst program recipients and host a recipient gathering to promote knowledge sharing and further collaboration.</p>

EEA – Residential Energy Efficiency Portfolio

Provides technical and financial support to improve home energy efficiency and comfort. In 2017-18, the portfolio consisted of:

No-Charge Energy Savings Program: Provides direct installation of energy efficient products to Albertans, including LED lightbulbs, high-efficiency shower heads, faucet aerators, smart power bar and smart thermostat.

Residential Retail Program

- Home Improvement: Participants receive a rebate on installed home-retrofit products based on the energy savings. Eligible products include windows, insulation, drain water heat recovery and tankless hot water heaters (installed by a certified contractor).
- Instant Savings: Consumers receive point-of-sale discounts at participating retailers for



- purchases of select energy efficient products during spring and a fall campaigns.
- Online Rebates: Residents receive rebates on eligible clothes washers, refrigerators, smart thermostats and high-efficiency furnaces.

Estimated Cumulative Reductions to 2021	Funding
1.0 Mt CO ₂ e	\$79.7 Million
Milestones	Next Steps
<p>Over 150,000 households registered for the No-Charge Energy Savings Program. Registrations closed in November 2017. All installations were completed by August 2018.</p> <p>Over 600 retail locations representing 200 retailers sold over nine million energy efficient products through two instant savings programs.</p> <p>The high level of participation started to transform the lighting retail supply market.</p> <p>Over 900 contractors registered, and over 10,000 applications were submitted for the Home Improvement Rebates Program.</p> <p>Community-based programming funded four initiatives:</p> <p>Empower Me Community Connection: community-based engagement targeting new Canadians, seniors and urban Indigenous households.</p> <p>Empower Me Energy Poverty Pilot: will support 138 homes in a community-based approach to implement natural gas and electricity measures and provide energy education to limited-income households.</p> <p>Alberta Rural Development Network: funds energy efficient products for the Sustainable Housing Initiative, building net-zero affordable housing (primarily in rural communities).</p> <p>Habitat for Humanity: funds energy efficient products for new builds and retrofits.</p>	<p>Home Improvement Program: Introduction of a whole-home approach to allow for more tailored retrofits and deeper savings.</p> <p>Instant Savings and Online Rebates Programs: Maintain at a lower investment level.</p> <p>Affordable Housing Energy Solutions Program: In partnership with the Ministry of Seniors and Housing, this new program will offer direct, no-charge installation of low-cost energy efficiency products for Alberta's affordable housing tenants – scheduled to commence in fall 2018.</p>

EEA – Non-Residential Energy Efficiency Portfolio

Provides technical and financial support to help the business, not-for-profit, institutional and



industrial sectors achieve energy savings, reduce GHG emissions and reduce operational costs. In 2017-18, the portfolio consisted of the following programs:

Business Energy Savings Program (formerly Business, Non-Profit and Institutional): Offers financial incentives to businesses, non-profits and institutions to choose high-efficiency products, including lighting and HVAC systems. The industrial pilot offered financial incentives on measures specific to small to medium industrial sites.

Non-Profit Energy Efficiency Transition (NEET): Helps non-profits take early action to plan for energy-efficiency improvements by providing energy audits and energy management plans.

Industrial Energy Efficiency: offers financial incentives on measures specific to small and medium industrial sites.

Estimated Cumulative Reductions to 2021	Funding
97,000 tCO ₂ e	\$18.7 Million
Milestones	Next Steps
<p>Business Energy Savings Program:</p> <ul style="list-style-type: none">• More than 1,200 participating organizations.• \$3.5 million in rebates delivered (average of \$2,600 per project).• Private capital contributions of more than \$11 million in investments by Alberta organizations.• 138,000 GJ per year in expected energy savings. <p>Additional products launched in February 2018 tailored to industrial facilities (excluding large final emitters).</p> <p>NEET:</p> <ul style="list-style-type: none">• Over 180 organizations participated, with 152 energy audits completed.	<p>Custom Energy Savings: a new program supporting the unique requirements of industrial customers, including energy management.</p> <p>Build on successful programming in the commercial and institutional sector to deliver economic and environmental benefits to all Albertans.</p> <p>Enable non-profits to take the next step from energy management planning to energy management actions through specific and targeted programs.</p> <p>NEET: Develop a new offering to assist non-profits in implementing measures identified in the audits.</p>



EEA – Public Awareness, Industry Training and Capacity Building Portfolio

An enabling strategy to assist in developing and supporting other energy efficiency programs, creating a culture of energy efficiency and guiding market transformation through consumer behaviour change.

EEA provides funding for educational resources and projects targeting underserved markets, as well as funding for technical training targeting energy professionals, municipal building inspectors and trade allies.

Estimated Cumulative Reductions to 2021	Funding
Enables energy savings and GHG emissions reductions.	\$4.96 Million
Milestones	Next Steps
<p>Participated in more than 425 public events that engaged over 41,000 people.</p> <p>Participated in more than 30 industry events, engaging over 7,000 attendees at conferences and trade shows.</p> <p>Provided \$25,000 to the Alberta Energy Efficiency Alliance to deliver a two-day Alberta Energy Efficiency Summit, with participation from 300 industry professionals.</p> <p>Provided \$750 to the Canada Green Building Council Green Homes Summit, with participation from 100 industry professionals.</p> <p>Delivered industry training and capacity building by partnering with the Electrical Contractors Association of Alberta, the Canadian Solar Industries Association, the Canadian Institute for Energy Training, the Canadian Manufactures and Exporters Association, the Energy Futures Lab, the Canada Green Building Council and the Solar Energy Society of Alberta.</p>	<p>Continue to build public awareness and understanding of energy efficiency along with developing industry capacity and networks to further enable a culture of energy efficiency in Alberta.</p>

Farm Energy Programs

Energy Savings for Agri-Processors (small) Program (ESAP-small): shares the costs of investments that improve energy efficiency in agri-processing facilities; includes high-efficiency upgrades and sub-meters to make agri-processors more aware of their energy use



and how to improve their bottom line.

Energy Savings for Agri-Processors (large) Program (ESAP-large): targets the agri-processing sector (large agri-businesses) and provides funding for custom projects that support transformational investments in energy efficiency technology and systems. The program targets energy reduction in agri-processors for projects greater than \$500,000.

Irrigation Efficiency Program (IEP): supports producers' investments in new or upgraded low-pressure center pivot irrigation equipment for their operations, improving the energy efficiency and water use of farms.

On-Farm Energy Management Program (OFEMP): shares the costs of investments that improve energy efficiency on farms; includes high-efficiency upgrades and on-farm sub-meters to make farmers more aware of their energy use and how to improve their bottom line.

On-Farm Solar Photovoltaic Program (OFSP): provides grants towards installing solar photovoltaic systems on farms, enabling producers to conserve fossil fuels and reduce carbon emissions, reducing the environmental footprint of Alberta's agriculture industry.

Estimated Cumulative Reductions to 2021	Funding
43,984 tCO ₂ e	\$8.7 Million
Milestones	Next Steps
ESAP-small: <ul style="list-style-type: none">32 grants, totaling close to \$330,000 to agri-processors to purchase equipment to improve energy efficiency.Estimated annual GHG reductions of 723 tCO₂e in 2017/18 and approximately 9,470 tCO₂e once fully funded and implemented.	Program open to applications.
ESAP large: <ul style="list-style-type: none">One grant for \$4 million.Estimated annual GHG reductions of 7,410 tonnes in 2017/18 and 218,500 tCO₂e once fully funded and implemented.	Approval of Terms and Conditions, November 2018. Program open to applications.
IEP: <ul style="list-style-type: none">283 grants totaling more than \$2 million paid to farmers to upgrade to more efficient irrigation equipment.Estimated annual GHG reductions of approximately 1002 tCO₂e in 2017/18 and 1,915 tCO₂e once fully	Program open to applications.



funded and implemented.

OFEMP:

- 74 grants totaling more than \$2 million to farmers and ranchers to buy more energy-efficient equipment.
- Estimated annual GHG reductions of approximately 1672 tCO₂e in 2017/18 and 9,786 tCO₂e once fully funded and implemented.

Program open to applications.

OFSP:

- 38 grants paid to farmers and ranchers to buy and install grid-tied solar panels.
- Estimated annual GHG reductions of about 189 tCO₂e in 2017-18 and 3,470 tCO₂e once fully funded and implemented.

MCCAC – Community Infrastructure Greening Program

Delivered by the MCCAC, this program will support communities with their green infrastructure needs and deploy energy efficiency or renewable energy measures at existing community buildings, for example community rinks, arenas, swimming pools, etc.

Estimated Cumulative Reductions to 2021	Funding
TBD based on full program design.	\$17.5 Million
Milestones	Next Steps
Initial program design.	Program and participation details to be released by fall/winter 2018. Program implementation.

MCCAC - Municipal Fleet Greening Program

Delivered by the MCCAC, this program will focus on funding electric and high-efficiency non-transit municipal fleet vehicles and associated infrastructure, with an emphasis on regional collaboration and smaller municipalities. Program design will focus on incentives, eligibility, and potential uptake.

Estimated Cumulative Reductions to 2021	Funding
TBD based on full program design.	\$5 Million



Milestones	Next Steps
Initial program design.	Full program design. Program launch by spring 2019.

Additional Contributors

Taking Action to Manage Energy + (TAME+): This MCCAC initiative provides incentives for energy efficiency upgrades to municipal facilities as recommended by detailed energy audits. Program participation helps municipalities understand how energy is used in their buildings, identify key energy savings opportunities, and implement retrofit projects.

Milestones	Next Steps
Supported 23 projects representing 11 municipalities (Beaver County, Black Diamond, Drayton Valley, Edmonton, Fort Saskatchewan, Holden, Innisfail, Red Deer County, Stettler, Wainwright, Whitecourt) Program fully subscribed. Since launch, supported 45 projects representing 25 municipalities. 2,730 tCO ₂ e annual GHG reductions.	Continue to support existing participants as projects reach completion.

TAME Express: This program delivered by MCCAC provides Alberta municipalities with quick access to prescriptive financial incentives for the implementation of high-efficiency lighting retrofits. Without the need to perform a detailed energy assessment, TAME Express offers rebates for retrofits of indoor lighting, outdoor building and parking lot lighting, lighting controls, and exit signs.

Milestones	Next Steps
Supported 49 projects representing 24 municipalities (Brazeau County, Bruderheim, Coalhurst, Crowsnest, Drayton Valley, Drumheller, Edmonton, Falher, Flagstaff, Grand Prairie, Lacombe, Milk River, Municipal District of Provost, Parkland County, Pincher Creek, Red Deer County, Redcliff, Slave Lake, Strathcona County, Taber, Trochu, Vegreville, Wetaskiwin, Wheatland). Program fully subscribed. Since launch, supported 56 projects representing 29	Continue to support existing participants as projects reach completion.



municipalities.

1,024 tCO₂e annual GHG reductions.



Innovation and Clean Technology

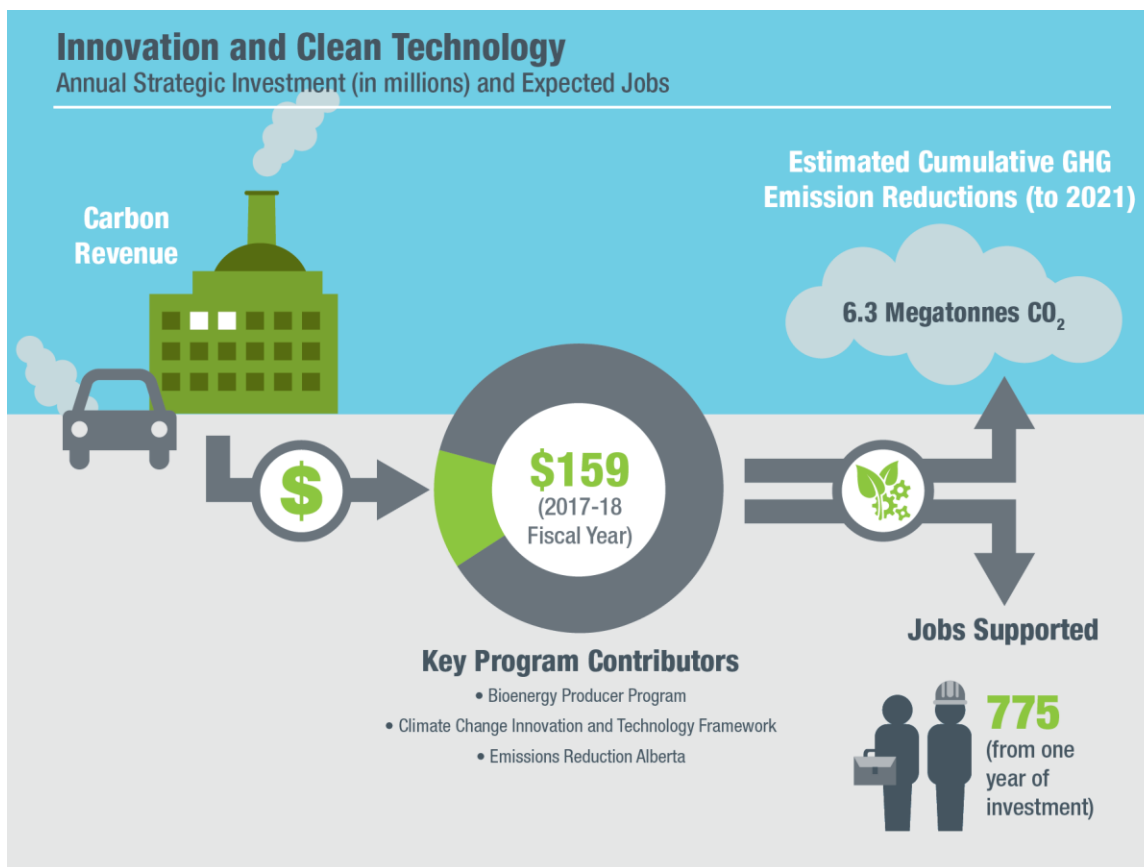
Objectives

Alberta is committed to becoming a leader in innovation and clean technology to facilitate meaningful GHG emissions reductions and build a more diverse lower-carbon economy. Innovation and Clean Technology programs, policies and investments focus on the following objectives:

- Demonstrate innovation and clean technology **leadership and partnership** through actively leveraging collaboration and funding.
- **Reduce GHG emissions** through innovation and clean technology.
- **Support/stimulate economic growth** through innovation and clean technology investments.

Strategic Investments

In 2017-18, \$159 million was invested to support program delivery, including Emissions Reduction Alberta (ERA), the Climate Change Innovation and Technology Framework and the Bioenergy Producer Program. It is estimated this investment supported about 775 jobs and may result in 6.3 Mt of cumulative emission reductions by 2021.



Note: CLP Progress Report 2016-17 estimated cumulative emissions reductions to 2020 at 8 Mt based on 2011 to 2016 for Clean Technology. The comparative 2016-17 result based on 2016 to 2020 is 3.6 Mt.

Progress Summary

Indicator data are based on data and results from Emissions Reduction Alberta (ERA). This agency, formerly the Climate Change and Emissions Management Corporation, has been in place since 2009. It is funded by the Climate Change and Emissions Management Fund to accelerate development of innovative technologies that reduce GHG emissions.

The CLP confirms the key role of innovation and clean technology in achieving its outcomes. On December 5, 2017, the GoA publicly released the Climate Change Innovation and Technology Framework. The Ministry of Economic Development and Trade (EDT) has been working with Alberta Innovates (AI) and ERA to establish a co-ordinated approach to develop and deliver a suite of programs under the framework. Work also began early in 2017 on a systems approach to performance management and evaluation for the framework. Measures, indicators, information and associated results will be updated in future reporting.



Performance Measures/Indicators	Baseline (2015)	Result (2017)	Desired Result	5-Year Trend	Status
Indicator results are based on ERA reported data for this year's progress report.					
1. Innovation Leadership and Partnership					
1.1 Clean Technology Investment (total cumulative million \$)	270	314	Continued investment	—	
1.2 Leveraged Investment (ratio of \$ leveraged for every \$ invested by the Government)	4.1	3.5	>1.0	▼	●
1.3 Collaborative Partnerships (qualitative results)	Table ICT 1.3 Clean Technology Collaborative Partnerships				
2. GHG Emissions Reductions through Innovation and Clean Technology (ICT)					
2.1 Estimated GHG Emissions Reductions – ICT Initiatives (kilotonnes [Kt] of CO ₂ e emissions)	875	993	Increasing trend	▲	●
2.2 Estimated Methane Emissions Reductions – ICT Initiatives (Kt of CO ₂ e emissions)	74.9	87.8	Increasing trend	▲	●
2. Estimated GHG Emissions Reductions – Electricity ICT Initiatives (Kt of CO ₂ e emissions)	595	652	Increasing trend	▲	●
3. Economic Development/Growth					
3.1 ICT Support of Oil Sands Emissions Reductions	3.1 Narrative Results				
3.2 ICT – Commercial Viability	3.2 Narrative Results				

▲ Positive upward trend ▼ Negative downward trend ● Projected to meet or surpass target — Not Applicable



Progress Detail

1.1 Clean Technology Investment

Description

Clean Technology Investment measures the total ERA investment in millions of dollars cumulative from 2011 through to the reporting year. Results are rounded to the nearest million. Future CLP clean technology reporting will expand this indicator definition and refine its methodology.

Importance

Alberta's success in reducing GHG emissions requires innovation that lowers costs and increases competitiveness. The CLP is investing to accelerate the research, development and deployment of clean technology on which this innovation depends. It is important to monitor these investments and their associated results. Historically, ERA's investments spanned the innovation spectrum, but under the new innovation and technology framework, ERA will largely focus on demonstration and first-of-its-kind deployment projects.

Desired Result

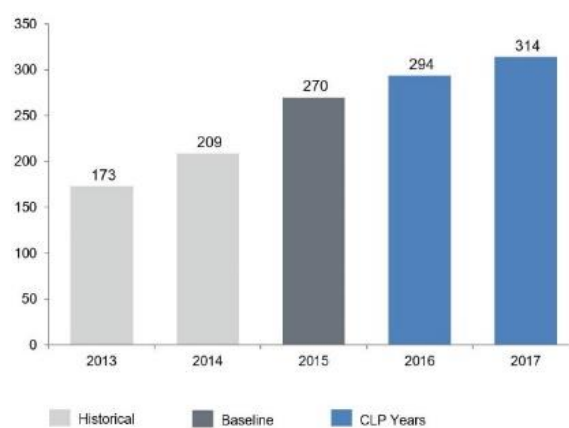
Continued investment.

Progress

From 2011-2017, ERA committed \$314 million to 120 innovative emissions-reducing projects. These investments were distributed across all stages of innovation, but over 90 per cent is committed to the latter stages of innovation (demonstration and first-of-a-kind deployment) that will achieve substantial emissions reductions by 2030.

ERA funds projects in four areas of focus under its Technology Roadmap: Reduced GHG Footprint of Fossil Fuel Supply; Low-Emitting Electricity Supply; Biological Resource Optimization; and Industrial Process Efficiency. ERA's Technology Roadmap, the policy direction provided by the CLP and

Figure ICT 1.1: Clean Technology Investment (million \$)



Data source: Emissions Reduction Alberta



the innovation and technology framework informs the areas of focus for investment and provides guideposts to help shape ERA's portfolio.

The net increase in ERA's total funding commitment of \$20 million from 2016 is due to new funding commitments and changes to ERA's funding portfolio. During 2017, ERA committed \$31 million to 12 methane-reducing projects under its ERA Methane Challenge. The Methane Challenge funded technologies to help monitor, detect, or reduce methane emissions in Alberta. In addition to these new funding commitments, ERA had one project terminate in 2017 and other adjustments to funding commitments resulting in an \$11 million reduction in total ERA committed funds.

In July 2017, ERA launched the Oil Sands Innovation Challenge, which made \$50 million available for technologies that reduce GHG emissions and improve the cost competitiveness of bitumen. In early 2018, ERA concluded the Oil Sands Challenge and announced \$70.6 million of funding to nine innovative projects. The quality of submissions—and their potential impact—led ERA's Board of Directors to increase funding for the challenge by \$20 million.

ERA also launched its \$35 million (over three years) Industrial Efficiency Challenge in 2018 to accelerate deployment and adoption of leading technologies that reduce GHG emissions and improve cost competitiveness. This funding will support large emitters subject to the CCIR. ERA and the GoA are also working with ECCC to secure an additional \$8 million to augment this call.

In addition, competitive calls for proposals will be supplemented by ERA's Partnership Intake program that allows projects referred by ERA as "Trusted Partners" to be evaluated and considered for funding in an ongoing manner, outside of the call for proposal process.

ERA also has funds in 2018 for additional initiatives to address key GoA priorities areas that align with the focus areas of ERA's Technology Roadmap and the CLP. These include industrial efficiency at facilities impacted by the CCIR, community energy generation and methane reduction.

1.2 Leveraged Investment

Description

Leveraged Investment measures investment from other funding partners as a ratio to every dollar invested by ERA. ERA requires that every dollar it invests be at least matched by private resources. A result greater than 1.0 means funding partners have invested more than 50 per cent of the total project cost.



Importance

Government investment is key in developing and commercializing clean technologies and innovation. Partnerships maximize the value of these investments. This leverage is particularly important to advance, scale up and commercialize certain technologies.

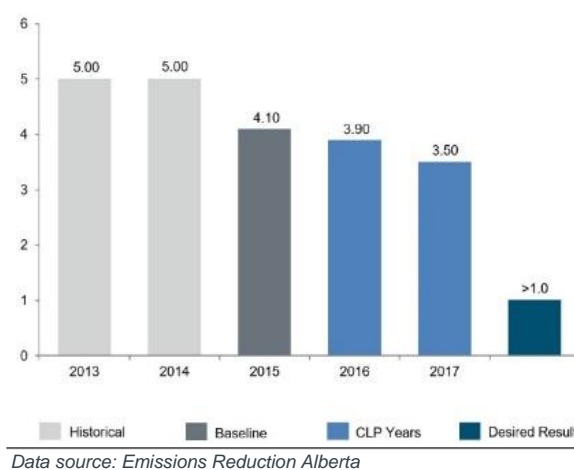
Desired Result

Greater than 1.0 leveraged investment ratio.

Progress

The 2017 figure is well above the 1.0 target. More than 75 per cent of ERA project costs are funded by partners, representing a significant contribution to the Alberta and national economy. The decline in leveraged investment in the past few years reflects the economic slowdown and lower private capital availability, making ERA's investment even more critical. This metric, however, is expected to move towards a positive trend. In February 2018, ERA approved funding under the Oil Sands Innovation call for nine projects with total estimated leverage, for that call alone, expected to be over 9.0. These projects will be reported in the 2018 reporting year.

Figure ICT 1.2: Leveraged Investment Ratio



Looking to 2018, ERA established collaborative relationships to explore co-funding of its Partnership Intake program with Natural Resources Canada, Sustainable Development Technology Canada and other programs. ERA is also looking to leverage investment from the federal government for industrial efficiency.

Note: The leverage of ERA's total portfolio is adjusted to exclude one project from 2013. The Blackspring Ridge Wind Project received \$10 million to support total costs of about \$600 million. Removing this project helps normalize ERA's leverage to show an investment of \$304 million for projects valued at almost \$1.4 billion. Blackspring Ridge would bring investment to \$314 million and value to almost \$2 billion.



1.3 Collaborative Partnerships

Collaborative and strategic partnerships are critical for clean technology development and commercialization. Government actively leverages domestic, federal and international collaborations to accelerate technology development and address Alberta's market demands.

Table CT 1.3: Collaborative Partnerships identifies ERA's partners and collaborations by type.

Partner Type	Organization / Program	Collaboration Type			
		Funding	Strategic Alignment & Engagement	Proponent Training & Support	Conferences & Workshops
Federal Government	ECCC	✓	✓		
	Natural Resources Canada (NRCAN)	✓	✓		✓
	Sustainable Development Technology Canada (SDTC)	✓	✓	✓	✓
Provincial Governments & Agencies	Alberta Agriculture and Forestry		✓		
	Alberta Climate Change Office		✓		✓
	Alberta Economic Development and Trade		✓		✓
	AESO		✓		
	Alberta Energy		✓		✓
	AER		✓		✓
	Alberta Innovates	✓	✓	✓	✓
	BC Innovative Clean Energy Fund		✓		
	Energy Efficiency Alberta	✓	✓		✓
	MaRS – Discovery District		✓		✓
	Ontario Centres of Excellence	✓	✓		✓



Partner Type	Organization / Program	Collaboration Type			
		Funding	Strategic Alignment & Engagement	Proponent Training & Support	Conferences & Workshops
Provincial Advisory Groups	Alberta Energy Efficiency Panel		✓		
	Alberta Diversification Advisory Committee		✓		
	OSAG		✓		✓
Municipal Agencies	Innovate Calgary		✓	✓	✓
	TEC Edmonton		✓	✓	✓
Academic Institutions	University of Alberta	✓	✓		✓
	University of Calgary	✓	✓		✓
	NAIT		✓		✓
Financial Organizations	Alberta Enterprise Corporation		✓		
	Alberta Treasury Branch		✓		✓
	Business Development Bank of Canada		✓		✓
Industry, Organizations, Associations	Alberta Clean Technology Industry Alliance		✓		✓
	Canadian Association of Petroleum Producers		✓		✓
	Canada's Oil Sands Innovation Alliance		✓		✓
	Clean Resources Innovation Network		✓		✓
	EVOK Innovations	✓	✓		✓
	Energy Futures Lab		✓		✓
	Natural Gas Innovation Fund (Canadian Gas Association)	✓	✓		



Partner Type	Organization / Program	Collaboration Type			
		Funding	Strategic Alignment & Engagement	Proponent Training & Support	Conferences & Workshops
	Petroleum Technology Alliance Canada		✓		✓
	Zone Start-Ups		✓		✓
Non-Governmental Organization	Pembina Institute		✓		✓

2.1 Estimated GHG Emissions Reductions – ICT Initiatives

Description

Estimated GHG Emissions Reductions – ICT Initiatives measures the estimated decrease in annual Kt of CO₂e achieved directly by ERA initiatives. ERA calculates two different but related emissions reductions projections. One is each project's expected direct GHG emission reductions (provided by project proponents and reviewed by ERA).

The other is the estimated total market reductions from technology commercialization. Assumptions include policies and measures in place and arising from successful commercialization, GHG emissions intensity, estimated market size, economic indicators and technology lifespan.

ERA can make a significant impact by supporting development, demonstration and first-of-a-kind deployment of breakthrough technologies, but estimating their impact is difficult. They can lower GHG emissions significantly in the long term, but the considerable risk makes it hard to predict when a breakthrough may occur. To balance that risk, a large portion of ERA funding is committed to later-stage projects that offer substantial near-term emissions reductions. ERA continues to refine its methodology for estimating market potential and is working on longer projection timelines (to 2050) for longer-term emission reductions.

Importance

Investment in innovation and clean technology is a key lever to help industry reduce GHG emissions while saving money. Since innovation and clean technology is a long-term strategy, it is important to monitor the impact of investments over time.



Desired Result

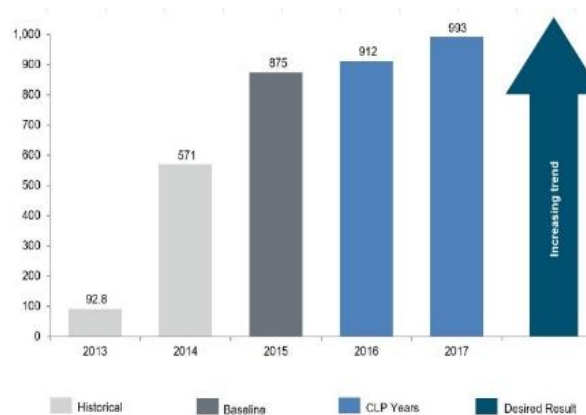
Increasing trend in GHG emissions reductions.

Progress

Cumulative emissions reductions for projects funded from 2011 through 2017 are estimated to be about 3.5 Mt, with just under 1 Mt of annual reductions in 2017.

Annual results in Figure ICT 2.1 show a significant increase for both 2014 and 2015. This is largely explained by the Blackspring Ridge Wind Project, which was funded in 2013, became operational in 2014 and had its first year of production in 2015. This project's emission reductions are over half of ERA's total emissions reductions from 2014 to 2017.

Figure ICT 2.1: Estimated GHG Emissions Reductions – ICT Initiatives (Kt of CO₂e)



Data source: Emissions Reduction Alberta

Increases are also noted in 2016 and 2017 when completed projects started operating, resulting in higher emissions reductions for those years and beyond.

Cumulative emissions reductions for ERA projects are estimated to be nine Mt by 2020, with additional market potential of more than four Mt the same year. By 2030, ERA projects are estimated to achieve 28 cumulative Mt of reductions. Projections for 2018 onward are based on current forecasts and assumptions. These estimates are updated and adjusted over time to reflect changes to project outcomes, timelines, or termination.

2.2 Estimated Methane Emissions Reductions – ICT Initiatives

Description

Estimated Methane Emissions Reductions – ICT Initiatives measures the estimated annual decrease in methane emissions that ERA initiatives have achieved in Kt of CO₂e. Measurement methodologies and assumptions are as described in Section 2.1 above, specific to methane.



Importance

Methane is 25 times more potent than CO₂¹⁰ as a GHG, making it an important target for reductions in the near term. Investment in innovation and clean technology is a key lever to help industry reduce methane emissions while saving money. Since innovation and clean technology is a long-term strategy, it's important to monitor the impact of these investments over time.

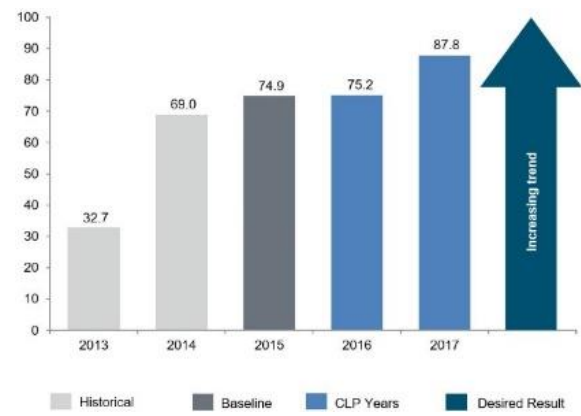
Desired Result

Increasing trend in methane emissions reductions from ICT initiatives.

Progress

Results to date have been relatively modest for the methane component. In 2017, ERA funded 12 projects to develop technologies to monitor, detect and reduce methane emissions. These projects are predicted to lower methane emissions by 0.4 Mt by 2020 and 2.4 Mt by 2030. These estimates are a subset of ERA's total GHG emission reduction estimates.

Figure ICT 2.2: Estimated Methane Emissions Reductions (Kt of CO₂e)



Data source: Emissions Reduction Alberta

2.3 Estimated GHG Emissions Reductions - Electricity ICT Initiatives

Description

Estimated GHG Emissions Reductions - Electricity ICT Initiatives measures the estimated annual Kt of CO₂e GHG emissions reductions from electricity projects funded by ERA.

Importance

Transitioning to a lower-carbon electricity system is a key objective of the CLP. New technologies and innovation are important to integrate renewables and low-carbon generation sources, maintain system reliability (smart-grid, energy storage, etc.) and diversify generation capacity.

¹⁰<https://www.epa.gov/ghgemissions/overview-greenhouse-gases#methane>



Desired Result

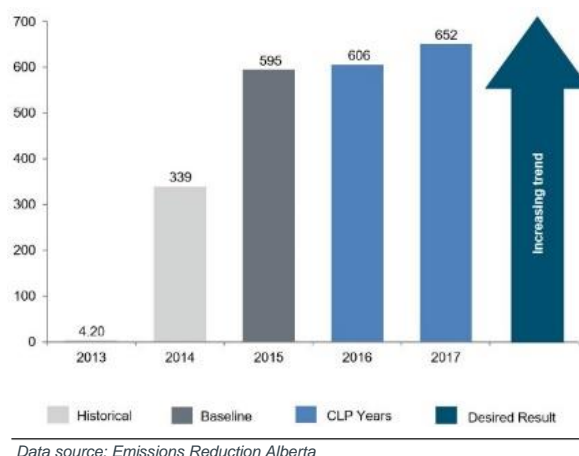
Increasing trend in emissions reductions from electricity ICT initiatives.

Progress

As previously stated, the 300 MW Blackspring Ridge Wind Project came online in 2014 and was responsible for the large emissions reduction estimates reported for 2014 and 2015. Projections for 2018 and beyond are based on current expectations.

Cumulative project-level emissions reductions to date, for the existing low-emitting electricity supply portfolio, are just over 2 Mt and are estimated to increase to 4 Mt by 2020 and 11 Mt by 2030.

Figure ICT 2.3: Estimated Emissions Reductions - Electricity Initiatives (Kt of CO₂e)



ERA will work closely with government, the AESO and industry to accelerate deployment of technology to phase-out coal-fired electricity generation, increase renewables and address the electricity market's technology needs.

3.1 Innovation and Clean Technology Support of Oil Sands GHG Emissions Reductions

ERA is responsible for projects that address the CLP's 100 Mt oil sands emissions limit. Between 2011 and 2017, ERA committed \$108 million to 19 projects in oil sands mining, in situ, upgrading and processing. These projects are valued at over \$600 million and include partnerships with 10 small and medium-sized enterprises.

Looking to 2018-19, ERA approved funding of over \$70 million for nine promising technologies that reduce GHG emissions while lowering the cost of bitumen production and processing. Approved projects are valued at over \$720 million, and GHG reductions are estimated to be 1.2 Mt by 2020 and 2.9 Mt by 2030. If adopted at a commercial scale, the technologies are estimated to lower annual GHG emissions in Alberta by up to 4.1 Mt of CO₂e by 2030.

In March 2018, ERA also launched a \$35 million, three-year Industrial Efficiency Challenge to help the commercial and industrial sectors lower emissions, energy use and costs. Also in 2018, the GoA granted ERA a further \$34.5 million to support additional application-based programming



for near-term, on-site GHG emissions and cost reduction technologies at facilities impacted by the CCIR, so they can reduce emissions and remain competitive.

3.2 Innovation and Clean Technology – Commercial Viability

Clean technology development and acceleration has four stages: R&D, development, demonstration and implementation. Technologies in the first-of-kind demonstration and implementation phases are closest to commercial viability. Table ICT 3.2 identifies funded projects in the late stage of development (demonstration and implementation), therefore, with the strongest likelihood for commercialization, though this depends on market need or uptake, funding, production and other factors.

ERA also funded nine promising technologies also funded under the Oil Sands Innovation Challenge in February 2018. These are all in the demonstration and implementation stages and have strong potential for commercialization.

Table ICT 3.2: Innovation and Clean Technology – Commercial Viability

Organization	Project Title	Innovation Stage
Acceleware Ltd.	Radio Frequency XL (RF XL) Enhanced Oil Recovery	Demonstration
ATCO Ltd.	Methane Imaging & Quantification System for Fixed Site Monitoring	Demonstration
Calscan Energy Ltd.	Demonstration of Near Zero Emission Well Control System	Demonstration
Canadian Fertilizer Institute I	Implementation of 4R Nutrient Stewardship and the NERP in AB	Demonstration
Canadian Fertilizer Institute II	Implementation of 4R Nutrient Stewardship and the NERP in Alberta (Phase 2)	Demonstration
Canadian Natural Resources Limited	Area Measurements of Methane & Carbon Dioxide	Demonstration
Capital Power Corporation	Genesee Wood Waste Biomass Co-Firing Project	Demonstration
CarbonCure Technologies	Carbon Dioxide Utilization in Concrete	Demonstration



Organization	Project Title	Innovation Stage
Carleton University - Carlos Monreal	Intelligent NanoFertilizers - The Dynamics of Soil Bacterial Genomics Associated with Root Exudates and Nitrogen Uptake by Wheat and Canola	Demonstration
DarkVision Technologies Inc.	Downhole imaging system for identifying wellbore leakage	Demonstration
ESEIEH Consortium (Devon Canada, Nexen Energy ULC, Suncor Energy Inc., Harris Corporation)	Effective Solvent Extraction Incorporating Electromagnetic Heating (ESEIEH)	Demonstration
Field Upgrading Ltd	Field Upgrading Pilot Plant	Demonstration
Genalta Power Inc.	Waste Heat Power Production from Amine Stream	Demonstration
Gentherm Global Power Technologies Inc.	Remote Generator Compressor Systems	Demonstration
GHGSat Inc.	Satellite-Aircraft Hybrid Detection and Quantification of Methane Emissions	Demonstration
Global Analyzer Systems Ltd.	Stack-top Temperature Reduction Project	Demonstration
GrowSafe Systems Ltd.	Deploying an Advanced Analytics Platform to Quantify Livestock Greenhouse Gas Emissions and Monitor Reduction Strategies at Individual Animal and Whole Operation Scale	Demonstration
Hi-Tec Fuel and Auto Ltd.	Engineering of the Natural Gas Dual Fuel Blend System for Heavy Duty Diesel Vehicles	Demonstration
Husky	Lashburn CO ₂ Capture Demonstration project	Demonstration
Imperial Oil	Cyclic Solvent Process	Demonstration
InvenTys	VeloxoTherm Carbon Capture	Demonstration
Kairos Aerospace, Inc.	Calibration and Demonstration of Aerial Methane Imaging for Efficient, Wide-Area Methane Emissions Detection	Demonstration
Landmark Group of Builders	NetZero (Ready) Home Design and Demonstration for Production Housing	Demonstration



Organization	Project Title	Innovation Stage
Mangrove Water Technologies	Field Pilot Demonstration of UBC's Waste-to-Value Innovation for Conversion of Carbon Dioxide and Desalination of Wastewater in Alberta	Demonstration
Mariner Partners Inc. (Shift Energy)	Beta Testing of EOS Technology	Demonstration
MEG Energy	Heavy Crude Quality Improvement	Demonstration
Morgan Solar Inc.	Alberta Solar One	Demonstration
NSolv Corporation	Solvent Based Gravity Drainage for SAGD Applications	Demonstration
Peyto Exploration	In-Pipe Turbine Generator Field Demonstration Project	Demonstration
PTAC Petroleum Technology Alliance Canada	Targeted PureJet Incinerators for Methane Challenges	Demonstration
Purlucid Treatment Solutions Inc.	Low Energy Water Treatment for Steam Assisted Heavy Oil Recovery	Demonstration
SBI BioEnergy Inc.	Renewable Transportation Fuel	Demonstration
Solidia Technologies	Solidia Concrete - A Sustainable Method for Cement Production and CO ₂ Utilization	Demonstration
Suncor Energy Inc. Oil Sands	OTSG Oxy-fuel Demonstration Project	Demonstration
Tetra Tech, Inc.	Biocovers for Greenhouse Gas Mitigation from Landfills	Demonstration
The Prasino Group	Piloting the Days on Feed and Reduced Age at Harvest Protocols in Alberta /Piloting the Nitrous Oxide Emissions Reduction Protocol in Alberta	Demonstration
Titanium Corporation Inc.	Reducing Methane Emissions and Other Environmental Impacts from Oil Sands Tailings and Ponds	Demonstration
University of Alberta - John Basarab	Methane Emissions from Beef Cattle Bred for Low Residual Feed Intake	Demonstration



Organization	Project Title	Innovation Stage
University of Calgary	Control of Point-Source Low-Volume Methane Emissions using Methane Biofiltration Technology	Demonstration
Viresco Solutions Inc.	Demonstration of Reduced Enteric Methane Emissions in Growing/Finishing Beef Cattle	Demonstration
Alliance Pipeline (NR Green Limited Partnership)	Whitecourt Energy Efficiency Project	Demonstration
Cenovus Energy Inc.	Post Combustion Carbon Capture using Molten Carbonate Fuel Cell Pilot	Demonstration
McGill University	Field-Deployment of a Carbon Dioxide Transformation System Powered by Sunlight	Demonstration
New Sky Energy	Soda Ash and Bicarbonate from a Low Energy Natural Gas Sweetening Process	Demonstration
TransAlta	Enabling Increased Intermittent Green Generation via Wind Energy Storage	Demonstration
ATCO Gas	Combined Heat and Power (CHP) for Commercial and Institutional Buildings	Implementation
Cenovus Energy Inc.	Installation of Air/Fuel Ratio Controllers and Vent Gas Capture on Engines	Implementation
City of Edmonton Waste Management Branch	Implementation of High Solids Anaerobic Digestion Technology at the Edmonton Waste Management Centre	Implementation
ConocoPhillips Canada	Company-Wide Rollout of a Systematic Energy Efficiency Program Leading to Significant GHG Reductions in Alberta's Oil and Gas Industry	Implementation
EDF EN Canada and Enbridge Inc.	Blackspring Ridge Wind Project	Implementation
Elemental Energy	Brooks Solar 1 Facility	Implementation
EnCana Corporation	Vent Gas Capture for Engine Fuel Use	Implementation
Enmax Corporation	ENMAX Micro Renewable Energy Project	Implementation



Organization	Project Title	Innovation Stage
Genalta Power Inc.	Emission-Free Electrical Power from Multiple Waste Energy Sources	Implementation
Grow the Energy Circle Ltd.	GrowTEC On-Farm Waste to Renewable Energy Technology	Implementation
Landmark Group of Builders	Large Scale Building Integrated Solar PV Demonstration in Production Housing	Implementation
Lethbridge Biogas Limited Partnership	Lethbridge Biogas/Cogeneration Project	Implementation
Saltworks Technologies Inc.	Low Energy Produced Water Treatment	Implementation
West Fraser Mills Ltd.	Bio-Methanation with Power Generation	Implementation
Weyerhaeuser Company Limited	Weyerhaeuser Grande Prairie Evaporator Project	Implementation



Contributing Programs

Primary

Bioenergy Producer Program

Climate Change Innovation and Technology Framework

Emissions Reduction Alberta

Program Highlights

**512,000
MWh**

Renewable electricity production
supported through Bioenergy Producer
Program

1.3 Mt CO₂e

Estimated GHG emission reductions by
2020 from projects funded under ERA's
Methane Challenge

**0.62 Mt
CO₂e**

Estimated GHG emission
reductions from Bioenergy
Producer Program

6

Climate Change
Innovation and
Technology
Framework programs
approved

\$70.6 Million

In funding approved to support 9
technologies under ERA Oil Sands
Innovation Challenge



Program Results

Bioenergy Producer Program (BPP)

This program helps bioenergy producers develop a sustainable bioenergy sector.

The program (April–September, 2017) supported production of liquid biofuels, electricity and heat from biogas, bio-mass combustion and wood pellets.

The BPP extension (October 2017 to March 2020) supports production of liquid biofuel and electricity producers. The first payment period ran from October 2017 to March 2018.

Estimated Cumulative Reductions to 2021	Funding
1.32 Mt CO ₂ e	\$23.3 Million
Milestones	Next Steps
<p><u>BPP</u> (April–September, 2017)</p> <p>Completed payments to 27 grant holders</p> <p>Supported production of:</p> <ul style="list-style-type: none">• 380,000 MWh of dispatchable renewable electricity• 19 million litres of biofuels• Over 1.7 million GJ of avoided natural gas consumption for process heat• Estimated GHG emission reductions of 0.45 Mt <p><u>BPP Extension</u> (October 2017 to March 2020)</p> <p>Signed Grant Agreements with six successful applicants and awarded grants for two and a half years</p> <p>Completed payments to six grant holders for October 2017 to March 2018.</p> <p>Supported production of:</p> <ul style="list-style-type: none">• Over 132,000 MWh of dispatchable renewable electricity• Over 30 million litres of liquid biofuels <p>Estimated GHG emission reduction of 0.17 Mt</p>	<p>Review grantees reporting documents and process payments.</p> <p>Review application from facilities who submitted Expressions of Interest.</p>



Climate Change Innovation and Technology Framework

CCITF's objective is that, by 2030, Alberta's use of innovation and clean technology will accelerate the shift to a lower-carbon economy, generating significant environmental and economic benefits.

Estimated Cumulative Reductions to 2021	Funding
TBD – at early program stage.	\$2.0 Million
Milestones	Next Steps
<ul style="list-style-type: none"> The CCITF was publicly released and related CCITF program funding announced on December 5, 2017. An integrated suite of six programs spanning all stages of the innovation system. Five programs are led by EDT and delivered by Alberta Innovates (AI) and EDT and one program (Scale-up and Large-scale Demonstration) is led by ERA. <p>The five programs are:</p> <ul style="list-style-type: none"> Clean Technology Development Clean Technology Networks and Emerging Partnerships Clean Technology Commercialization (includes a clean technology-specific portion of the Alberta Investor Tax Credit which is funded by carbon levy revenue) Clean Technology Business Innovation (includes a clean technology-specific portion of the Capital Investment Tax Credit which is funded by carbon levy revenue) Clean Technology Facilities Support <p>Most programs launched March 2018, but there were two early milestones in 2017-18.</p>	<p>CCITF program launches and project funding decisions will continue through 2018-19.</p>



Distributed Energy Management Initiative (DEMI) hosted at the Northern Alberta Institute of Technology (NAIT) was awarded funding under the Clean Technology Networks and Emerging Partnerships program. DEMI provides laboratory validation and technical support to the private sector in testing and developing new distributed energy management and smart grid technologies. Alberta funding leveraged \$4.7 million cash and in-kind from industry partners (Siemens and ATCO).

Also, four Alberta-based small businesses were issued tax credits through the Alberta Investor Tax Credit program for innovative product development that align with the CCITF.

Emissions Reduction Alberta

ERA is a key partner in Alberta's CLP. Its actions are guided by the CCITF and by the Alberta Research and Innovation Framework (ARIF). Funding comes from carbon pricing under the CCIR. Strategic priorities are to accelerate technology, drive commercialization and maximize the impact of the public investment. ERA's investment portfolio includes projects that reduce CO₂e and methane emissions from cleaner oil and gas development, a low carbon electricity system, sustainable waste management with best use of biological resources, and better industrial efficiency.

Estimated Cumulative Reductions to 2021	Funding
4.95 Mt CO ₂ e	\$134.5 Million
Milestones	Next Steps
<p>ERA Methane Challenge:</p> <ul style="list-style-type: none">• In July 2017 12 projects were awarded funding, totaling \$30.6 million.• Focus on field-pilot and demonstration projects for methane monitoring, detection and reduction in the oil and gas, power generation, agriculture and forestry sectors.	<p>Ongoing support to funded projects.</p> <p>ERA's "BEST" Challenge (Biotech, Electricity, Sustainable Transportation):</p>



- GHG emission reductions projected to be 1.3 Mt by 2020 and 7.5 Mt by 2030.

ERA Oil Sands Innovation Challenge:

- \$70.6 million of funding was approved in February 2018 to support nine promising technologies with combined total project values of \$723 million.
- These technologies will help Alberta's oil sands sector meet the province's limit on oil sands emissions at 100 Mt per year.
- The Challenge was launched in July 2017 and sought innovative technologies that reduce GHG emissions and improve the cost competitiveness of bitumen production and processing within in situ or mined oil sands operations.
- The projects are estimated to result in potential GHG emissions reductions of up to 4.1 Mt of annual CO₂e emissions reductions in Alberta by 2030.

ERA Industrial Efficiency Challenge was launched in 2017-18 and a funding decision is expected in December 2018. This call will fund projects that:

- Involve field piloting, commercial demonstration, or large-scale deployment of leading industrial efficiency technologies at a "Large Final Emitter" site in Alberta (TRL 7-9).
- Reduce the quantity of energy or GHG emissions to produce the same or greater output.
- Be complete within three years after commencement.
- Demonstrate how the solution is "leading" – such as first of kind, first in Alberta, first in industry or first at facility.
- ERA is working with the GoA to leverage up to \$8 million of federal funding to augment this call.

ERA launched a partnership intake pilot in 2017-18 that allows proposals from "trusted partners" to be evaluated and considered for funding in an ongoing manner.

ERA established trusted partnerships with Alberta Innovates, Energy Efficiency Alberta, the University of Calgary, the University of Alberta, the NAIT, SDTC, NRCan, Ontario Centres of Excellence, the Natural Gas Innovation Fund, and Evok Innovations.

Call launched in July 2018 that focused on three interrelated areas;

- Technologies to support a low carbon electricity system.
- Technologies to enhance sustainable transportation and mobility.
- Technologies to optimize biological resources.
- Funding of \$70 million was made available for this call with funding approvals expected in February 2019.



ERA hosted SPARK 2017 from November 6-8, 2017.

- More than 560 innovation and business leaders attended the conference, which featured more than 80 speakers.
- The event was co-hosted with Alberta Innovates and brought clean tech researchers and innovators together with representatives from the business community, government and the innovation system.

ERA continued to foster existing partnerships; and develop new collaborations with a number of organizations in the innovation eco-system. Notable achievement for 2017-18 include:

- New collaborations with ECCC, BC Innovative Clean Energy Fund, Alberta Enterprise Corporation, Alberta Treasury Branch, Business Development Bank of Canada, Clean Resources Innovation Network and Zone Start-ups.

The GoA provided additional funding to ERA in 2017-18 for special initiatives:

- Initiatives include industrial efficiency, community generation and methane reductions.
- ERA will be working with the GoA in the next fiscal year to develop how best to support these initiatives.

Continue to foster existing and forge new domestic partnerships and collaborations.



Transit and Infrastructure

Objectives

Alberta is committed to supporting lower-carbon, accessible public transit and infrastructure. While reducing GHG emissions, investments in these areas also support economic growth, sustain well-paying jobs and contribute to a better quality of life. Transit and Infrastructure programs and investments are designed to achieve the following:

Transit:

- **Reduce GHG emissions** through increased use of low-emission public transportation.
- Support public well-being through **increased access to low-emission public transportation and active transportation modes.**

Infrastructure:

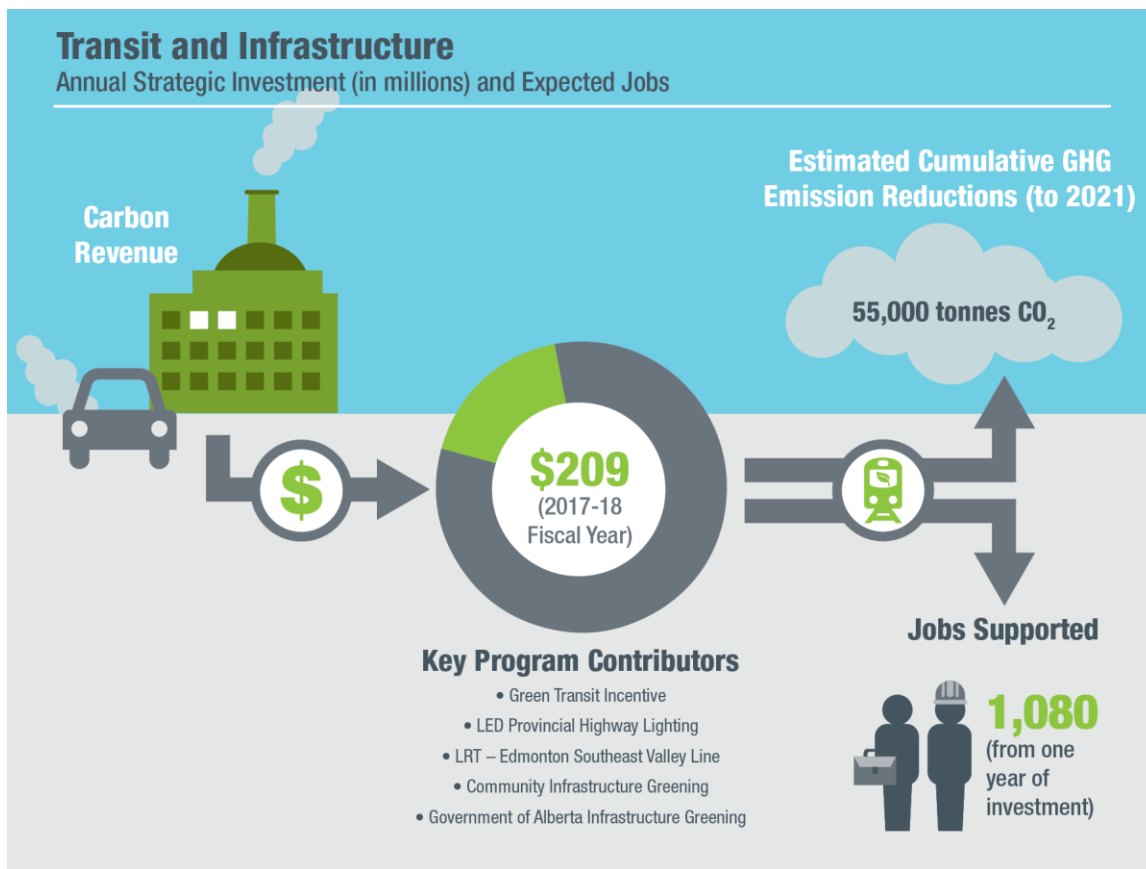
- **Reduce GHG emissions** through increased energy efficiency/reduced energy consumption of public infrastructure.



Strategic Investments

In 2017-18, government invested \$209 million in this action area, including the Green Transit Initiative (GreenTrip), LED Provincial Highway Lighting, the Edmonton Southeast Valley Light Rail Transit (LRT) Line, and Infrastructure Greening programs. The estimated results are 1,080 supported jobs and a cumulative emissions reduction of 55,000 tonnes CO₂e by 2021. The majority of emissions reductions from this action area will be realized beyond 2021 due to large capital projects with a longer implementation time.

Though no expenditures were made on the Calgary Green Line LRT in 2017-18 from CLP funds, government has committed \$1.53 billion to Stage 1 beginning in 2018-19.





Progress Summary

Performance Measures/Indicators	Baseline (2015)	Result (2017)	Desired Result	5-Year Trend	Status
1. Reduce GHG Emissions (Transit)					
1.1 Alberta Transit Ridership (millions of rides)	214	199*	Increasing trend	—	●
1.2 Alberta's Low-Carbon Fleet (total number of non-diesel vehicles in Alberta's transit fleet as a percentage of Alberta's total transit bus fleet)	5.60	4.70	Increasing trend	▲	●
1.3 GHG Emissions Reductions from CLP-funded Transit Initiatives (total tonnes of CO ₂ e GHG emissions)	0	1,924	36,900/yr (once all projects commissioned)	NA	NA
2. Support Public Transit Accessibility					
2.1 Affordable Housing Units within 1 km of Major Transit Stations or Parks and Rides (#)	NA	NA	6,250/yr (once all projects commissioned)	NA	NA
3. Reduce GHG Emissions (Infrastructure)					
3.1 Energy Consumption Intensity of GoA Owned and Operated Facilities (mega joules per square metre, fiscal year,)	1,664	1,649	Decreasing trend	NA	NA
3.2 GHG Emissions Intensity of GoA Owned and Operated Facilities (tCO ₂ e per square metre, fiscal year)	0.127	0.132	Decreasing trend	NA	NA

*Preliminary result.

▲ Positive upward trend ● Projected to meet or surpass target ● Projected to be near target — Steady trend
NA – Not available



Progress Detail

1.1 Alberta Transit Ridership

Description

Alberta Transit Ridership measures the total number of millions of conventional, auxiliary and specialized trips in a year, including concession fare trips, as reported by municipalities and regions to the Canadian Urban Transit Association. Conventional transit services include regular scheduled bus and light rail. Auxiliary trips are those arranged to meet the needs of passengers who sign up in advance, and/or serve a non-local community. Specialized transit service provides curb-to-curb or door-to-door demand response to persons with disabilities. Due to an 18-month lag in data, 2017 results are preliminary.

Importance

Traveling by public transportation uses less energy and produces less pollution than comparable travel in private vehicles. Public transportation reduces CO₂ emissions by reducing the growth in vehicle kilometers of travel, easing congestion and supporting more efficient land use (American Public Transportation Association, The Benefits of Public Transportation). More public transit use also shows public behaviour changes that contribute to CLP outcomes.

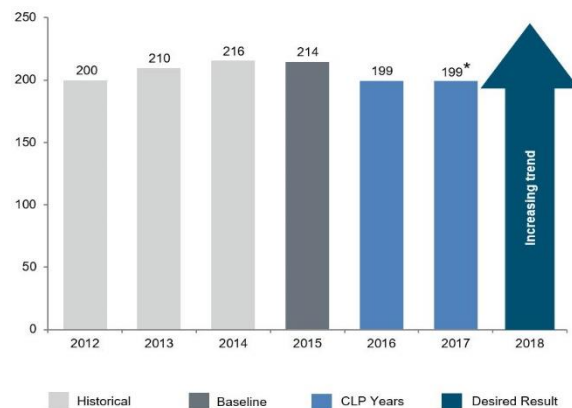
Desired Result

Increasing trend in transit ridership.

Progress

Results for 2012 through 2017 show an overall steady trend in Alberta's transit ridership. After three years of increase, there was a slight decrease in 2015 and 2016, which may have been related to the economic downturn and higher unemployment. The economy began to recover in 2017, so transit ridership is expected to grow again.

Figure TR 1.1: Alberta Transit Ridership (total # of public transit rides in millions)



Data source: Canadian Urban Transit Association: Canadian Transit Fact Book, Operating Data (2011-2016)

*Preliminary result



1.2 Alberta's Low-Carbon Fleet

Description

Alberta's Low Carbon Fleet measures the total number of non-diesel vehicles as a percentage of the total number of bus fleet vehicles, as reported by municipalities/regions to the Canadian Urban Transit Association. Non-diesel vehicles include hybrid, biodiesel, gasoline, electric and compressed natural gas (CNG). There may be regional gaps in the indicator data; 2017 results are not available until 2019.

Importance

As Alberta focuses on increasing the use of public transit, it is important that public transit also moves to lower emissions intensity. This indicator monitors Alberta's progress towards low-emission public transportation.

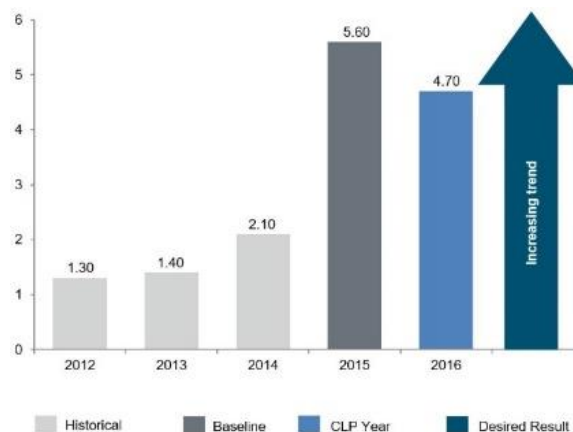
Desired Result

Increasing trend in Alberta's low carbon fleet.

Progress

The results for 2012 through 2015 showed a growing percentage of low carbon vehicles. This reversed slightly in 2016, when transit providers added more diesel buses. The upcoming Alberta Community Transit (ACT) Fund aims to address this by providing grants for low carbon buses.

Figure TR 1.2: % of non-diesel vehicles in Alberta's total transit/bus fleet



Data source: Canadian Urban Transit Association: Canadian Transit

1.3 GHG Emissions Reductions from CLP-funded Transit Initiatives

Description

This measures annual CO₂e emissions reductions from CLP-funded transit initiatives. Results show emissions reductions from CLP-funded GreenTrip projects, which included new electric buses and LED lighting in transit infrastructure. A large portion of the emissions reductions will be achieved after CLP-funded light rail transit (LRT) projects are completed.



Importance

Public transportation can reduce CO₂ emissions by reducing the growth in vehicle kilometers of travel, easing congestion and supporting more efficient land use, (American Public Transportation Association, The Benefits of Public Transportation). More public transit use shows public behaviour changes that contribute to CLP outcomes.

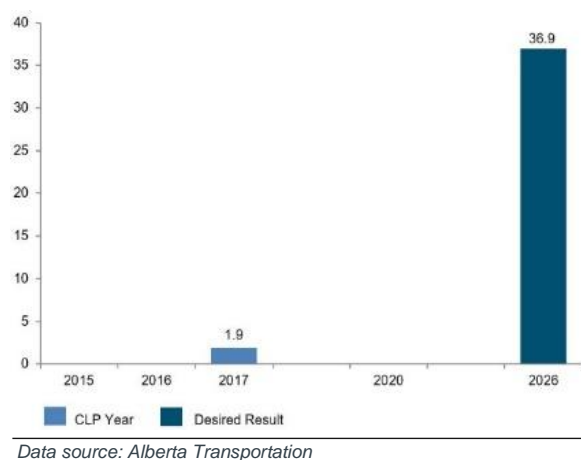
Desired Result

Increasing trend in GHG emissions reductions from CLP-funded transit initiatives with a desired result of 36,900 tCO₂e annual emissions reductions by 2026. This reflects commissioning of both the Edmonton Valley Line and the Calgary Green Line LRTs.

Progress

In 2017, projects under the GreenTrip program reduced close to 2,000 tCO₂ of emissions. Results are expected to increase significantly once LRT projects are fully commissioned. Further details on GreenTrip progress, milestones and contributing projects are in the Program Summary table.

Figure TR 1.3: GHG Emissions Reductions from CLP-funded Transit Initiatives (kilo tCO₂e)



2.1 Affordable Housing Units with Access to Transit

Description

This measure estimates the total number of affordable housing units within one kilometer of CLP-funded LRT stations. Increasing the number of affordable housing units with good access to public transit supports transit ridership, which reduces GHG emissions and improves community well-being. This measure will not report results until LRT projects are completed.

The funding recipient determines the existing number of affordable housing units within one kilometre of each station. Affordable housing is defined by the Calgary Homeless Foundation as follows:

“Non-market housing is typically described as subsidized, social or affordable housing units. Non-market housing varies in its operations, but commonly has rents below market value, may provide social services or supports, and is typically targeted to individuals and families with low-incomes.” This includes:



- Non-market rental housing
- Non-market supported/supportive housing
- Non-market rental housing for seniors
- Non-market rental housing for youth
- Transitional housing

Funding recipients use internal databases and GIS techniques to report to Alberta Transportation on the estimated number of affordable housing units within one kilometre of LRT stations.

3.1 Energy Consumption Intensity of Government of Alberta Facilities

Description

Energy Consumption Intensity of Government of Alberta Facilities measures the total energy used in government-owned and -operated facilities as a factor of total floor space in the building portfolio. Floor space data is determined using an internal building information database. Energy data are collected through utility bills. To overcome inconsistencies, each bill is calendarized, that is, prorated over the desired timeframe (i.e. daily, monthly, annually etc.). Buildings that are vacant, demolished or used seasonally are excluded so their floor space does not affect results. Data processing and analysis are mainly through automated processes, reducing human errors or biases. Data are reported after government's fiscal year, so the most recent result is for 2017-18.



Importance

As a major property owner, GoA must lower energy use intensity and emissions intensity of its operations. This indicator monitors the GoA's progress towards low-emission public buildings.

Desired Result

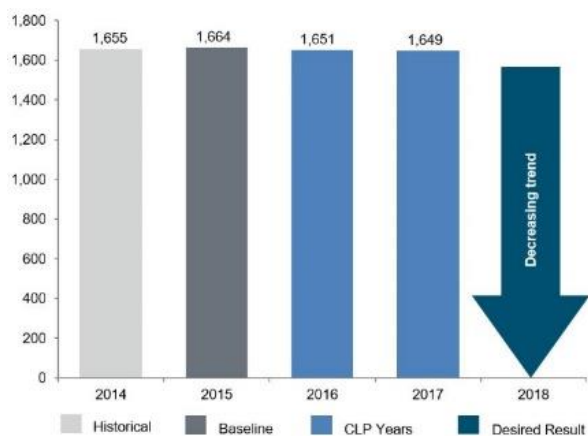
Decreasing trend in energy intensity.

Progress

Between 2014-15 and 2017-18, Energy Consumption Intensity decreased from 1,655 MJ/m² to 1,649 MJ/m². This is the result of an increase from new building space, and a decrease from major renovations and energy efficiency projects. This trend is expected to continue. The expected result for this reporting period was 1,650 MJ/m², indicating that Alberta Infrastructure is on the right track. This year's result follows a generally consistent trend over the past four reporting years.

The exception is 2015-16, in which the portfolio's highest consuming facility increased its operating period from eight months per year to 12 months.

Figure TR 3.1 Energy Intensity of GOA Owned and Operated Facilities (mega joules/m²)



Data source: Alberta Infrastructure

3.2 GHG Emissions Intensity of Government of Alberta Facilities

Description

This measure is calculated by first determining the total energy used in government-owned and -operated facilities as a factor of total floor space, then multiplying by a grid factor. The grid factor is a ratio provided by the ECCC National Inventory Report on GHG emissions that indicates GHGs emitted per unit of electricity from Alberta's electricity grid. Floor space data come from an



internal building information database. Energy data are collected through utility bills. Data calendarization, inclusion/exclusion, processing and analysis are as described in Section 3.1.

Importance

See Section 3.1

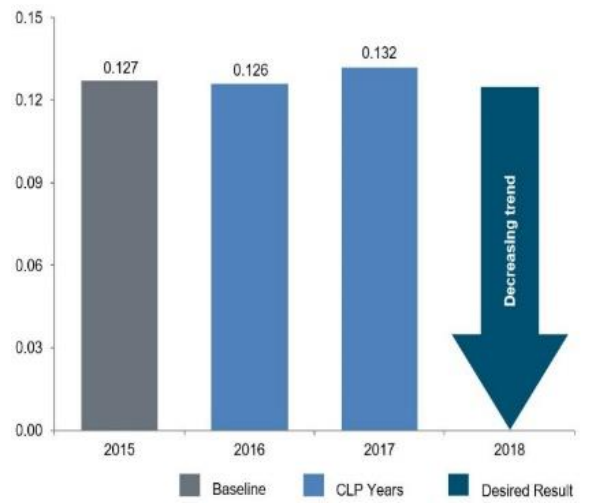
Desired Result

Decreasing trend in GHG emissions intensity.

Progress

The 2017-18 actual result is 0.132 tCO₂e/m², a 4.8 per cent increase from the previous reporting year. The variance is mainly due to a change in the calculation methodology. Methodology is expected to remain stable in the future. A minor increase is also caused by new buildings into the portfolio. Small variations may occur from new buildings and energy efficiency projects. The GoA is committed to accurate emissions measurement.

Figure TR 3.2 GHG Emissions Intensity of GOA Owned and Operated Facilities (tCO₂e/m²)



Data source: Alberta Infrastructure



Contributing Programs

Primary	Supporting
Green Transit Incentive Program LRT – Edmonton Southeast Valley Line Infrastructure Greening (GoA) MCCAC - Community Infrastructure Greening Program	MCCAC - Municipal Fleet Greening Program (reported on in Energy Efficiency action area)

Program Highlights

\$175.7 M

In funding for Edmonton
Southeast Valley Line

May 25, 2018

Alberta Conversion Technology Centre
opened in Calgary

5,400

Highway luminaries selected for LED
replacement throughout Alberta

**1,800
tonnes**

Of annual GHG emission
reductions from hospital LED
lighting retrofits

80-90%

Reduction in energy consumption
expected for new Valleyview Municipal
Building built to Passive House standard



Program Results

TRANSIT

Green Transit Incentives Program

This is a competitive, application-based program that provides capital funding for new and expanded public transit projects. It funds projects that will provide Albertans with more sustainable public transit alternatives for local, regional and inter-municipal travel.

Estimated Cumulative Reductions to 2021	Funding
7,696 tCO ₂ e	\$6.47 Million
Milestones	Next Steps
<p>5 municipalities received funding:</p> <ul style="list-style-type: none"> • Cold Lake • Edmonton • Grande Prairie • Red Deer • St. Albert <p>GreenTRIP projects supported:</p> <ul style="list-style-type: none"> • CNG building and CNG bus replacement. • Bus stop enhancement and GPS scheduling. • Electric buses • Upgrading lighting to LED • Transit garage electrical infrastructure upgrades • Solar energy system including battery storage for electric buses 	Ongoing program implementation.

LRT – Edmonton Southeast Valley Line



This program supports the City of Edmonton's Southeast Valley Line LRT expansion.

Estimated Cumulative Reductions to 2021	Funding
4,500 per year once LRT is operational	\$176 Million
Milestones	Next Steps
Continued construction of the LRT line. Previously approved loan converted into a grant.	Continued construction with Phase 1 expected to be completed by 2020.

INFRASTRUCTURE

Infrastructure Greening

CLP infrastructure funding supports construction and upgrading of government buildings and other infrastructure to higher standards, to improve energy efficiency and to increase renewable electricity consumption.

Estimated Cumulative Reductions (tCO ₂ e) to 2021	Funding
Alberta Carbon Conversion Technology Centre Birch River Conservation Area Foothills Medical Centre Power Plant: 27,300 Green Infrastructure Planning Studies Heart Lake Lookout Site: 96 Martin Fire Base Solar Power: 410 Hinton Geothermal FEED Study LED Lighting for Health Facilities: 7,250 LED Provincial Highway Lighting System Retrofit: 7,677 Miscellaneous Project Delivery Oil-Sands Froth Treatment Tailings Planning Study and Pilot Demonstration Valleyview Municipal Building	\$26.73 Million
Milestones	Next Steps



Alberta Carbon Conversion Technology Centre opened May 25, 2018:

- Facility to test and advance CO₂ capture and conversion technologies enabling commercially viable conversion of CO₂ into value-added products.
- Constructed and commissioned with InnoTech Alberta providing site management.
- XPRIZE finalists will begin testing their technologies at the facility in early 2019.

Birch River Conservation Area:

- Supports redevelopment in Tallcree First Nation designed to continue to build a more sustainable, educated and innovative community.
- Planning phase initiated.

Foothills Medical Centre Power Plant Upgrade:

- Addition of a new combustion turbine generator for cogeneration to provide greener electricity with reduced GHG emissions.

Green Infrastructure Planning Studies::

- Studies to ensure Infrastructure's buildings are climate resilient and contribute to mitigating emissions.
- Four studies completed in 2017-18.

Heart Lake Lookout Site and Martin Fire Base Solar Power Projects:

- Incorporates solar technology to produce 24 hr power to operate Fire Base, eliminating need for diesel generator.
- 80 KW Prime Power pure DC plant to provide seamless public safety grade power to all operators on site.

Hinton Geothermal FEED Study:

- Engineering and design study to advance development of the Hinton Geothermal District Energy System.
- 22 government owned buildings and businesses have agreed to participate in the study.

Onboarding of first cohort of tenants.

Discussions with industry clients on post 2020 opportunities to use the facility.

Review and assessment of renewable energy options.

Construction expected to be completed by June 2019.

Equipment procurement, facility design and construction commencement.

Surplus funding (\$620,000) to continue with further studies.

Fully commissioned by May 2019.

The FEED Study final report is being finalized and will be submitted to Hinton Town Council following its completion. Council will make decisions about next steps, dependent on the findings of the study.



LED Lighting for Health Facilities:

- LED lighting retrofits occurred at 10 hospitals in four zones.
- Electrical consumption was reduced by 2.83 MWh annually.
- GHG emissions were reduced by 1,810 tCO₂e annually.
- 52,180 LED lamps were installed and 3,290 electronic ballasts.

LED Provincial Highway Lighting System Retrofit:

- Three sites selected, totaling approximately 5,400 luminaires.
- Installed 1,999 luminaires on Southwest Anthony Henday Drive (Edmonton).
- Completed design, engineering and materials with installation to be completed by end of 2018 construction season on Northwest Stony Trail (approximately 1,500 luminaires) in Calgary.

Miscellaneous Project Delivery

- Includes support to climate capacity building efforts such as the Cities and Climate Change Science Conference.

Oil-Sands Froth Treatment Tailings Planning Study and Pilot Demonstration:

- Quantified GHG and environmental impacts, expenses and gains from oil sands tailings and froth management.
- Study completed.

Valleyview Municipal Building:

- Grant to build new town office to the Passive House standard.
- Most buildings built to Passive House standard achieve 80-90 per cent reduction in building energy consumption compared to a conventional building.

Surplus funding (\$238,000) to continue with the LED lighting program at two sites.

Complete installation of Calgary luminaires.

Retrofit approximately 300 luminaires in 75 sites in Vermillion district.

Passive House related systems expected to be fully operational after December 31, 2018.

Indigenous Communities

Objectives

This action area is realized primarily through Alberta's Indigenous Climate Leadership Initiative (ICLI). That initiative was developed to align with implementing the principles of the United Nations Declaration on the Rights of Indigenous Peoples (UN Declaration). ICLI reflects the unique needs and priorities of Indigenous peoples and helps Indigenous leaders, communities, community-owned businesses and organizations realize the benefits and opportunities of climate leadership. Success relies on true partnerships based on overlapping priorities and shared benefits for Indigenous communities and organizations, and government.

Indigenous Communities and Organizations and Government of Alberta Shared Priorities and Benefits	
<ul style="list-style-type: none"> • Protect Mother Earth • Environmental stewardship 	<ul style="list-style-type: none"> • Reduce GHG emissions
<ul style="list-style-type: none"> • New jobs • Energy self-sufficiency 	<ul style="list-style-type: none"> • Stimulate a lower-carbon diversified economy
<ul style="list-style-type: none"> • Healthy people and communities 	<ul style="list-style-type: none"> • Increase community health and well-being
<ul style="list-style-type: none"> • Truth and reconciliation 	<ul style="list-style-type: none"> • Support a renewed relationship between Indigenous peoples and the GoA

ICLI is an innovative approach that sets a new precedent in Alberta and across Canada. Government, Métis and First Nations leaders are working together to address issues related to climate change and its impact on our environment and economy.

This action area focuses on the following objectives:

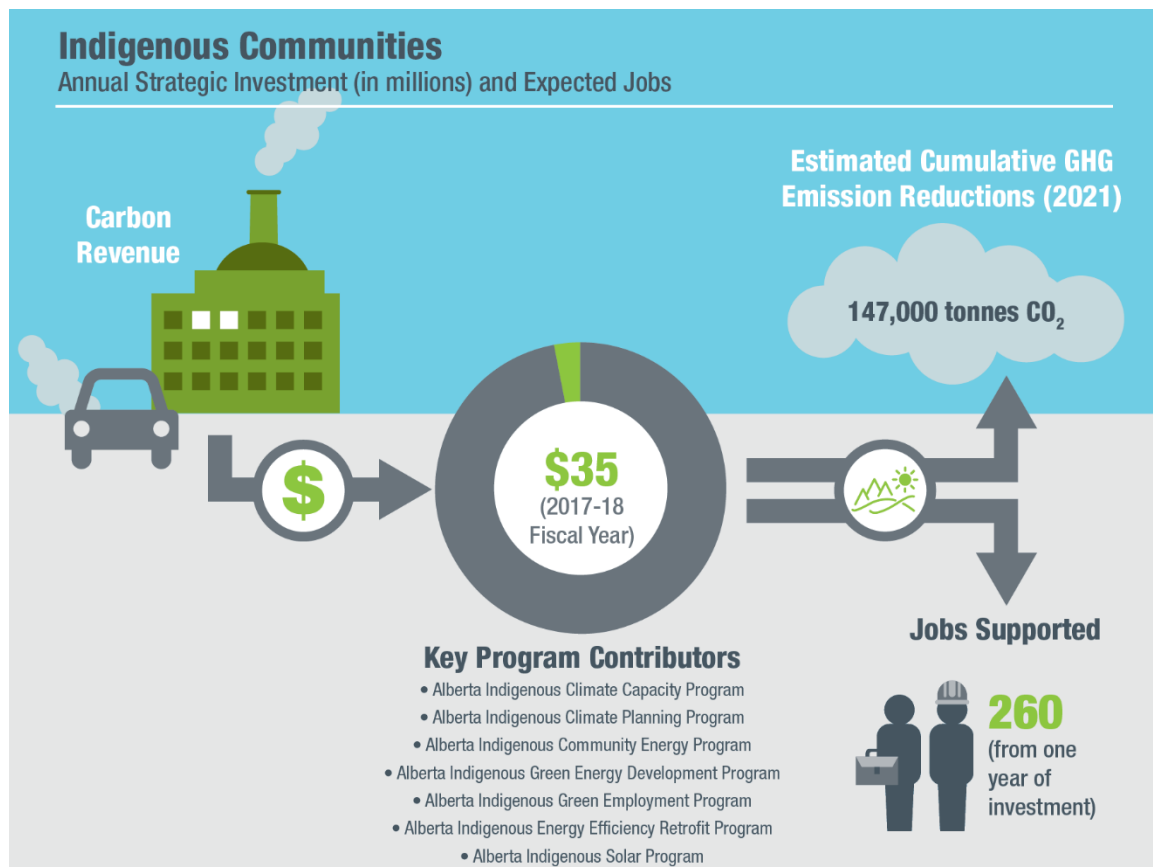
- **Ensure Indigenous Peoples, government and organizations are aware of the CLP** and the associated benefits and opportunities.
- **Ensure participation of Indigenous communities and organizations in the CLP** through development and delivery of climate leadership programs.
- **Ensure meaningful inclusion of Indigenous communities and organizations** in decision making on climate and energy issues related to the CLP.



- Work in partnership with Indigenous communities and leadership to establish a governance structure that enables shared decision-making related to ICLL programming.
- Work with Indigenous leaders and communities on electricity readiness that will enable more Indigenous participation in Alberta's electricity market and lower carbon economy.

Strategic Investments

In 2017-18, \$35 million was invested in this action area. The investment includes a suite of seven programs in renewable energy, energy efficiency and climate leadership capacity building. It is estimated this investment supported about 260 jobs and will reduce cumulative emissions by about 147,000 tonnes by 2021.



Progress Summary

Performance Measures/Indicators	Baseline (2015)	Results (2017)	Desired Result	Trend*	Status
1. Ensure Indigenous Peoples, governments and organization are aware of CLP					
1.1 Indigenous Communities and Organizations Engagement Activities (<i># held in fiscal year</i>)	0	77	Maintain or increase	▲	●
1.2 Indigenous Communities and Organizations Representatives Reached (<i># reached in fiscal year</i>)	0	1,318	Maintain or increase	▲	●
2. Ensure Participation of Indigenous Communities and Organizations in CLP					
2.1 Indigenous Climate Leadership Investments (<i>millions of \$ in fiscal year</i>)	0	35	Continued investment	▲	●
2.2 GHG Reductions from Indigenous Climate Leadership Programs (<i>tCO₂e emissions, fiscal year</i>)	0	36,800	Increasing trend	▲	●
2.3 Indigenous Communities or Organizations CLP Program Participation (<i>#, fiscal year</i>)	0	66	Maintain or increase	▲	●
3. Ensure Meaningful Inclusion in Decision-Making related to CLP					
3.1 Indigenous Communities' and Organizations' Assessment: CLP Engagement (<i>per cent of survey respondents who feel sufficiently engaged on CLP programs and policies</i>)	—	Available 2019	TBD	TBD	TBD

* - Year over year

▲ Positive upward trend

● Projected to meet or surpass target

NA – Not available



Progress Detail

1.1 Indigenous Communities and Organizations Engagement Activities

Description

Indigenous Communities and Organizations Engagement Activities measures the total number of engagement activities organized through ICLI in the fiscal year. It includes climate change awareness community workshops and a number of strategic Indigenous/GoA tables and working groups. These include the Governance Technical Working Group, the Indigenous Electricity Technical Working Group, First Nations and Métis Chief Executive Officer/ Assistant Deputy Minister tables, Indigenous Climate Leadership Co-ordinators and high level meetings that included the Minister and Indigenous leaders from across Alberta. Two notable meetings were the Indigenous-led Climate Change Summit and the Indigenous Leaders Apex on Climate, which were both held in the early spring of 2018. These events provided an important forum for First Nation and Métis leaders to have a focused dialogue on the future of ICLI. The format was wholly driven by Indigenous communities and was independent from the GoA.

As part of marketing the seven climate leadership programs. Indigenous communities and organizations attend information sessions or presentations in groups or one-on-one to discuss identifying a project, the funding process and particulars around project implementation and potential partnerships.

Importance

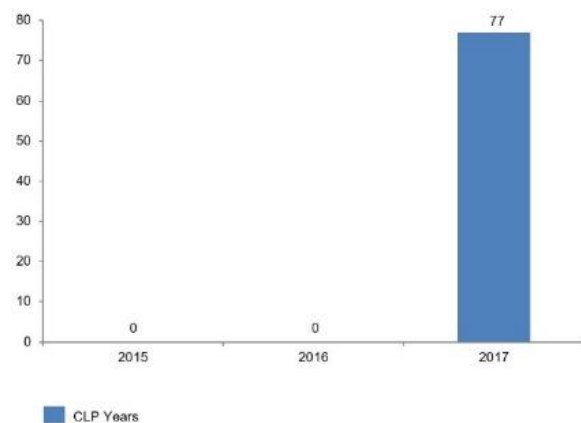
For meaningful Indigenous engagement and participation, it is important to build awareness of the CLP, its benefits and the opportunities to participate in policy and program funding. Monitoring the number of engagement activities will help to assess if activities or strategies have increased awareness, participation and engagement.

Desired Result

Maintain or increase the number of climate leadership engagement activities.

Progress

Figure SE 1.1: Indigenous Communities and Organizations' Engagement



Data source: Indigenous Climate Leadership Initiative

In 2017-18, there were 77 engagement activities. A significant number of these focused on raising awareness about the CLP, ICLI and climate change among Indigenous peoples. While engagement related to ICLI programs will continue, this next phase will relate more directly to Indigenous leadership and community technicians to increase participation of Indigenous communities and organizations in Alberta's lower carbon economy and joint decision-making. Extensive climate leadership engagement in 2016-17 were detailed in the 2016-17 CLP Progress Report. However, because this indicator is specific to ICLI, these activities were not included in the 2016 indicator result.

1.2 Indigenous Communities and Organizations Representatives Reached

Description

Indigenous Communities and Organizations Representatives Reached measures the total number of participants in ICLI engagement activities over the fiscal year. Participants included Indigenous community and organization membership, technicians and leaders.

Importance

More Indigenous peoples participating in ICLI engagement activities is expected to increase the level of awareness of the CLP and of the opportunities for further participation.

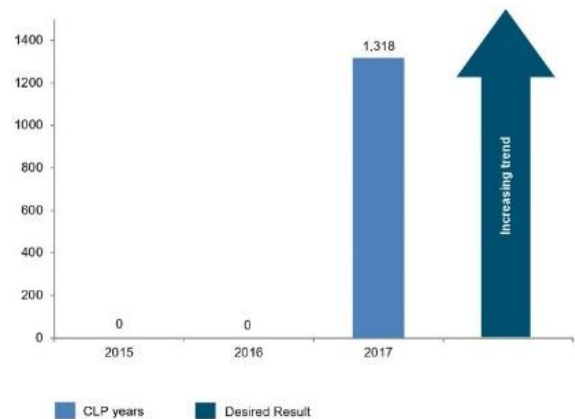
Desired Result

Increasing trend in the number of representatives reached.

Progress

In 2017-18 ICLI engagement reached more than 1,300 individuals. Feedback was captured in a number of ways, including a What We Heard document available on the Alberta Indigenous Relations website. Extensive climate leadership engagement in 2016-17 is detailed in the 2016-17 CLP Progress Report. However, as this indicator is specific to ICLI, these activities were not included in the 2016 indicator result.

Figure SE 1.2: Indigenous Communities and Organizations Representatives Reached



Data source: Indigenous Climate Leadership Initiative

2.1 Indigenous Climate Leadership Investments



Description

Indigenous Climate Leadership Investments measures the total amount (in millions of dollars) invested in Indigenous climate leadership programs in the 2017-18 budget year (April - March). In 2016-17, program activities generally fell under four categories: planning, infrastructure, climate leadership awareness and training. These were pilot projects and programs, but seven grant programs were launched in 2017-18 to increase awareness of climate leadership, increase capacity to act and increase participation. Several grant programs had direct impacts on reducing GHG emissions, increasing renewable energy, and increasing energy efficiency.

Importance

The Climate Leadership Advisory Panel report expects many Indigenous communities will experience more of the impacts of climate change due to factors that include their locations, economic situations and relationship with the environment. Government is committed to ensuring this reality is expressly taken into account as carbon levy revenue is invested.

Desired Result

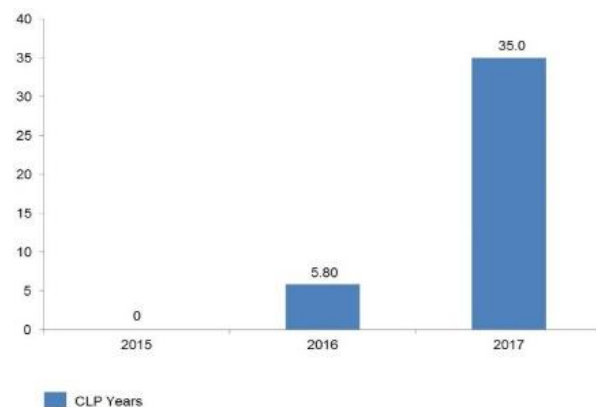
Continued investments.

Progress

In the 2017-18 fiscal year \$35 million was invested to support Indigenous communities and organizations. This funding was allocated to seven new Indigenous focused grant programs:

- Alberta Indigenous Climate Capacity Program
- Alberta Indigenous Climate Planning Program
- Alberta Indigenous Community Energy Program
- Alberta Indigenous Energy Efficiency Retrofit Program
- Alberta Indigenous Solar Program
- Alberta Indigenous Green Energy Development Program
- Alberta Indigenous Green Employment Program

Figure SE 2.1: Indigenous Climate Leadership Investments (\$ million)



Data source: Alberta Treasury Board and Finance

In addition, funding supported engagement and capacity building activities. Activities included continuing the Lubicon Lake Band Green Infrastructure Assessment, working with Indigenous communities adversely affected by the phase out of coal-fired emissions, and climate change awareness community workshops. Also, a number strategic Indigenous/GoA tables and working groups were established, including, the Governance Technical Working Group, the Indigenous Electricity Technical Working Group, the First Nations and Métis ADM/CEO Tables and Indigenous Climate Leadership Coordinators Meetings.

2.2 GHG Emissions Reductions from Indigenous Climate Leadership Programs

Description

GHG Reductions from Indigenous Climate Leadership Programs measures the annual GHG emission reductions in tonnes of CO₂e achieved by Indigenous climate leadership programs that directly reduce GHG emissions. While all Indigenous climate leadership programs support GHG emission reductions, or the potential to reduce emissions, many will achieve this indirectly through training, awareness, planning or other strategies. GHG emissions reductions are calculated for the project type (solar, energy efficiency, and so on). The results are combined for all direct emission reduction programs.

Importance

Indigenous peoples are at the forefront of the effects of climate change. The Alberta government is committed to Indigenous participation in all aspects of climate leadership. It is important to monitor the positive contribution that programs make towards meeting GHG emission reductions.

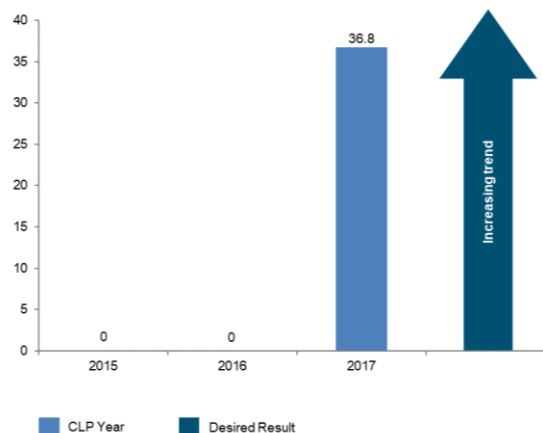
Desired Result

Increasing trend in emissions reductions from ICLI programs.

Progress

ICLI programs reduced emissions by 36,800 tonnes of CO₂e through solar, energy efficiency retrofit and green energy development. The investments created new opportunities for Indigenous communities to reduce GHG emissions and develop capacity in emerging fields, like renewable energy production. Based on the high level of participation in 2017-18, program up-take and results are expected to increase with higher program budgets.

Figure SE 2.2: GHG Reductions from Indigenous Climate Leadership Programs (thousand tCO₂e)



Data source: Alberta Climate Change Office, Implementation Branch, Planning and Reporting

2.3 Indigenous Communities and Organizations CLP Program Participation

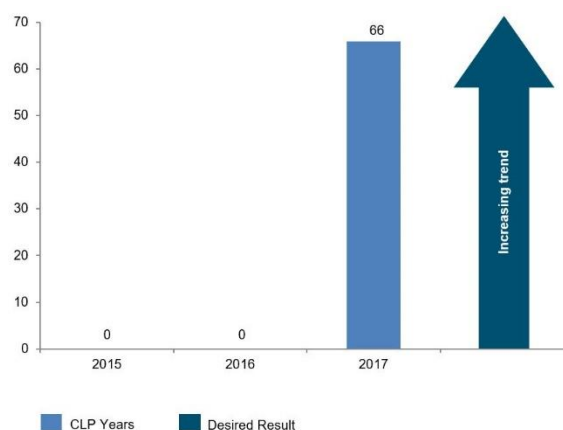
Description

This indicator measures the number of Indigenous Communities or Organizations that are participating in CLP-funded programs. Participation means Indigenous communities or organizations have approved and/or funded CLP projects within the fiscal year.

Importance

This indicator helps to monitor if Indigenous communities and organizations are able to access and participate in climate leadership programs. Benefits include common understanding, mutual trust and shared climate change targets that support changes to achieve CLP outcomes.

Figure SE 2.3: Number of Indigenous Communities or Organizations participating in CLP programs



Data source: Data source: Indigenous Climate Leadership Initiative

Desired Result

Maintain or increase the number of participating Indigenous communities or organizations.

Progress

In 2017, 66 Indigenous communities and organizations participated in climate leadership programs. Future engagement will relate more directly to Indigenous leadership and community technicians for joint decision-making and more participation in Alberta's lower carbon economy.

3.1 Indigenous Communities and Organizations Assessment: CLP Engagement

An engagement survey is expected to be published in winter 2019. Survey results will inform future ICLI engagement activities.

Contributing Programs

Primary	Supporting
<ul style="list-style-type: none"> • Alberta Indigenous Climate Capacity Program • Alberta Indigenous Climate Planning Program • Alberta Indigenous Community Energy Program • Alberta Indigenous Green Employment Program • Alberta Indigenous Green Energy Development Program • Alberta Indigenous Energy Efficiency Retrofit Program • Alberta Indigenous Solar Program 	<ul style="list-style-type: none"> • Birch River Conservation Area (reported on in Transit and Infrastructure action area)



Program Highlights

\$14 Million Provided to improve energy efficiency in Indigenous communities and organizations	1,156 Energy efficiency audits completed for community facilities and homes
26 Indigenous community energy plans and opportunity assessments funded through Alberta Indigenous Climate Planning Program	251 Training spots for Indigenous persons for employment training in the green economy
125 Building upgrades supported	6,600 tonnes Annual GHG emission reductions from Green Energy Development Program

Program Results

Alberta Indigenous Climate Capacity Program

This program builds technical and leadership capacity within Indigenous communities and organizations to:

- Increase climate leadership awareness, understanding and knowledge.
- Increase skills in green industries.
- Increase understanding of community energy opportunities and how local actions can decrease GHG emissions.
- Increase understanding of energy consumption of community-owned buildings.

Estimated Cumulative Reductions to 2021	Funding
Supports Indigenous communities and organizations in the transition towards a lower-carbon economy.	\$2.5 Million
Milestones	Next Steps
<p>Program launched June, 2017.</p> <p>Received completed applications for a total request of \$4.1million.</p> <p>16 programs funded for a total of \$2.5 million.</p> <p>\$1.8 million went to regional capacity development and awareness projects which targeted large areas and thus a large number of people.</p> <p>Provided resources to provincial level organizations to hire Climate Leadership Co-ordinators. This network of climate professionals helped build Indigenous capacity and expertise, and increase the Indigenous voice in policy and program design.</p>	<p>Collect information from grant recipients including but not limited to: number of people trained, interest in pursuing green jobs, and increase in climate change knowledge.</p> <p>Revise and release program guidelines providing \$3.5 million in funding for 2018-19.</p>

Alberta Indigenous Climate Planning Program

This program helps Indigenous communities establish an understanding of their current energy use, what their future needs will be and what renewable opportunities can be utilized.

Estimated Cumulative Reductions to 2021	Funding
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Supports Indigenous communities and organizations in the transition towards a lower-carbon economy.

\$2 Million

Milestones

Funded 26 projects, including 21 community energy plans and five opportunity assessments.

Funded 18 First Nations communities (eight from Treaty 6, three from Treaty 7 and six from Treaty 8).

Funded eight Métis communities (seven Métis Settlements and Métis Nation of Alberta Region 3).

Next Steps

Provide ongoing support to grant recipients to ensure project success. Support includes regular engagement, development of materials and information sharing.

Recommendations are being made and pending approval to improve program accessibility, value to communities, and drive continual improvement.

Alberta Indigenous Community Energy Program

This program provides tools and funding to help Indigenous communities and organizations understand how energy is used in their buildings, and identify opportunities for energy efficiency (reduction of GHG emissions) and reducing energy costs.

Estimated Cumulative Reductions to 2021

Supports Indigenous communities and organizations in the transition towards a lower-carbon economy.

Funding

\$3 Million

Milestones

Next Steps

Funded 18 communities and organizations.

Audited 106 community facilities and 1,050 homes and identified energy conservation measures (ECM).

Recipients are encouraged to use energy audits to apply to Alberta Indigenous Energy Efficiency Retrofit Program or other levels of government to implement the identified ECMs.

As an example, with support from this program, the Little Red River Cree Nation completed energy assessments in community-owned buildings. This will allow the nation to make energy efficiency upgrades and reinvest cost savings into other community priorities.

Program is oversubscribed with over 30 applications held over to 2018-19.

Collect deliverables for projects ending in 2017-18 fiscal year.

Finalize program guidelines for 2018-19 and share with stakeholders.

Implement 2018-19 program.

Alberta Indigenous Green Employment Program

Provides grants to the Alberta Aboriginal Skills and Employment Training Strategy agreement holders to train Indigenous people for jobs in the green economy. The program focuses on innovative ways to lower carbon emissions or use alternative energy sources. As Alberta transitions to a lower carbon economy, this type of employment will be increasingly important.

Estimated Cumulative Reductions to 2021

Supports Indigenous communities and organizations in the transition towards a lower-carbon economy.

Funding

\$2.5 Million

Milestones

Program launched June 2017.

Received applications totaling \$2 million.

Funded 11 applications.

An estimated 251 spots are allotted to train Indigenous peoples for employment in the green economy.

Next Steps

Collect deliverables for projects completed in 2017-18.

Assist in facilitating connections between ASETS agreement holders, employers and industry associations in the field.

Revise program guidelines and implement program based on 2018-19 funding.

Alberta Indigenous Green Energy Development Program



This program helps Indigenous communities and organizations acquire an ownership stake in the rapidly-expanding renewable electricity sector. The program focuses on community owned, commercial or community scale, renewable-energy generation projects that will lead to significant reductions in overall GHG emissions. These projects will increase renewable energy, which aligns with the CLP.

Estimated Cumulative Reductions to 2021	Funding
26,400 tCO ₂ e	\$8 million
Milestones	Next Steps
<ul style="list-style-type: none"> Funded 25 development projects. One implementation project funded. Reduced 6,600 tonnes of GHG annually. 	<ul style="list-style-type: none"> Collect deliverables for projects ending in 2017-18 fiscal year. Finalize program guidelines for 2018-19 and share with stakeholders. Implement 2018-19 program.

Alberta Indigenous Energy Efficiency Retrofit Program

This program provides grants to improve the energy efficiency of Indigenous community and organization-owned buildings. Projects reduce GHG emissions and provide energy savings.

Estimated Cumulative Reductions to 2021	Funding
9,600 tCO ₂ e	\$14 million
Milestones	Next Steps
<ul style="list-style-type: none"> Funded 10 applications. About 40 per cent of funding went to retrofit projects, 60 per cent to energy efficiency upgrades to new buildings. Estimated GHG reductions once fully implemented is 2,400 tonnes/year and 59,000 tonnes/lifetime. Upgrading 125 buildings in Indigenous communities. Benefited 24,054 First Nations members. As an example, the Tsuut'ina Nation will receive a \$2,157,000 grant to install a new ice plant in the Seven Chiefs Sportsplex. The ice plant and water system upgrades will save up to \$89,000 per year in electricity and heating costs over the next 30 years. 	<ul style="list-style-type: none"> Collect deliverables from grant recipients. Engage with communities to discuss opportunities and potential projects. Make recommendations for revisions to program guidelines and funding. By 2030, the energy savings from these upgrades will reach 999 terajoules (TG), which is roughly equivalent to the energy needs of 9,000 single family households

Alberta Indigenous Solar Program

This program provides grants to Alberta Indigenous communities or organizations to install solar photovoltaic (PV) systems on community or organization-owned facilities.

Estimated Cumulative Reductions to 2021	Funding
111,000 tCO ₂ e	\$3 Million
Milestones	Next Steps
<p>Funded 18 communities.</p> <p>Installed 4,475 panels.</p> <p>Estimated GHG reductions from funded projects are 27,800 CO₂e tonnes in 2017-18.</p> <p>Estimated lifetime savings from funded projects are \$3,470,000.</p> <p>As an example, the Beaver First Nation will save \$6,500 per year through program-supported initiatives</p>	<p>The program was oversubscribed in 2017-18. Thirty-three applications were carried over and will be reviewed against program guidelines for approval.</p>



Skills and Employment in Green Sectors

Transitioning electricity to renewables, energy efficiency programs, building clean technology and green infrastructure, and growing the oil sands sector under the 100 Mt emissions limit all contribute to diversifying Alberta's economy. CLP program investments create jobs directly, and indirectly through supply and access to clean products and services.

The following indicators help monitor the market demand for environmental skills, knowledge, experience and/or competencies and the impact of CLP investments on supported jobs.

Progress Summary

Performance Measures/Indicators	Baseline (2015)	Result (2017)	Desired Result	5 Year Trend	Status
1. Green Skills					
1.1 Green Skills Demand (<i>green job postings as a percentage of job postings in Alberta</i>)	1.50	1.70	Increasing Trend	NA	NA
2. Jobs Supported					
2.1 Alberta Jobs Supported (<i>total direct, indirect and induced jobs created or maintained as a result of actual CLP investment annually</i>)	—	5,012	Increasing trend	NA	NA

— Not Applicable

NA – Not Available



Progress Detail

1.1 Green Skills Demand

Description

Green Skills Demand measures the percentage of job postings in Alberta that are categorized as green according to Gartner Inc. definitions and methodology. These are defined as positions that are found at some level to be environmentally beneficial. This includes jobs that are purely green in focus, activities and skills (e.g. environmental sustainability planner), jobs that are primarily green (e.g. solar panel engineer), and jobs that are somewhat green (e.g. water plant operator).

Green skills demand is measured by extracting jobs postings from the Gartner's comprehensive database of job advertisements from 198 websites across Canada. Only job postings from known employers were considered.

Importance

Estimating the demand for skills for existing or new jobs is essential to transition to a lower-carbon, more diversified economy, as it helps prevent bottlenecks from a skills shortage.

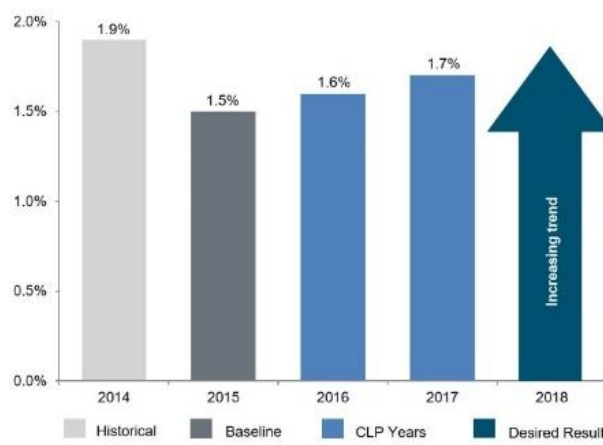
Desired Result

Increasing trend in demand for green skills.

Progress

The results show an increase in the percentage of green job postings in the last two years. However, the economic downturn in 2014 resulted in an overall 20 per cent decrease in job vacancies from 2014 to 2016. Green job postings have not yet reached 2014 levels. It is expected that the recent upward trend will continue from increased investments in lower-carbon sectors.

Figure SJ 1.1: Green Skills Demand (total percentage of green job postings in Alberta)



Data source: Gartner, Inc.



2.1 Alberta Jobs Supported

Description

Alberta Jobs Supported estimates the total direct, indirect and induced jobs from CLP actual investments. Direct jobs work on a project, indirect jobs are a result of the project (for example, supply jobs) and induced jobs result from increased household spending. One supported job is equivalent to one person-year (one year of employment for an individual). The Climate Change Office provided Statistics Canada with actual 2017-18 expenditures categorized by North American Industry Classification System codes for each CLP program. Statistics Canada calculated the measure using an input-output model.

Importance

CLP policies and investments provide economic as well as climate benefits, by stimulating the economy, increasing gross domestic product and supporting new jobs. Monitoring job numbers from CLP investments and comparing results over time will assess CLP's effectiveness.

Desired Result

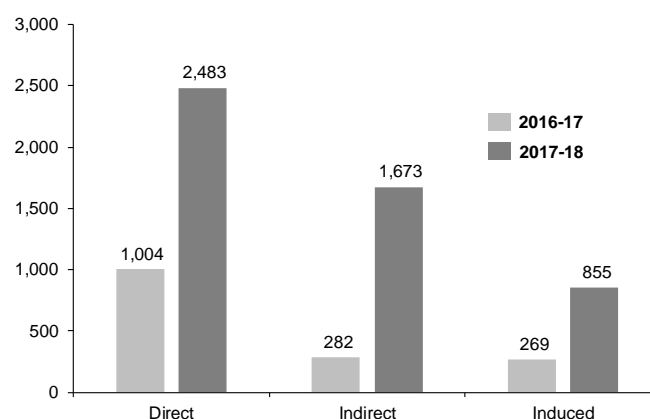
Increasing trend in the number of supported jobs.

Progress

In 2017-18, \$1.19 billion was invested into a lower carbon, more diversified Alberta economy to reduce GHG emissions and help Albertans with the transition. It is estimated this investment supported about 5,012 jobs. This is expected to go up as investment increases and as projects move into implementation and demand construction-related and operational jobs. This is a relatively conservative estimate as the methodology does not include the impact of leveraged CLP investments, only the direct spend.

Methodologies changed since the last progress report, so the number of supported jobs is not directly-comparable. Using the 2017-18 methodology, the 2016-17 CLP investment of \$335 million

Figure SJ 2.1: Alberta Jobs Supported (total number of direct, indirect and induced jobs)



Data source: Statistics Canada



supported 1,555 jobs. The 2017-18 CLP investment of \$1.19 billion supported 5,012 jobs, more than three times as many.

Appendix

Methodology

Forecasted GHG Emissions for Alberta (Ultimate Outcome – Reduced GHG Emissions)

In collaboration with Navius Research Inc., the Alberta Climate Change Office (ACCO) has undertaken sector and economy-wide assessments of economic and environmental (GHG) impacts using an environmentally integrated economic model. The economic model is a technology-rich computable general equilibrium model built by Navius Research Inc. and operated by ACCO staff. The model is built on Statistics Canada input-output tables (with some adjustments) and is calibrated to Environmental and Climate Change Canada National Inventory Reports.

Strategic Investments

Investment \$

Investments are actual 2017-18 expenditures.

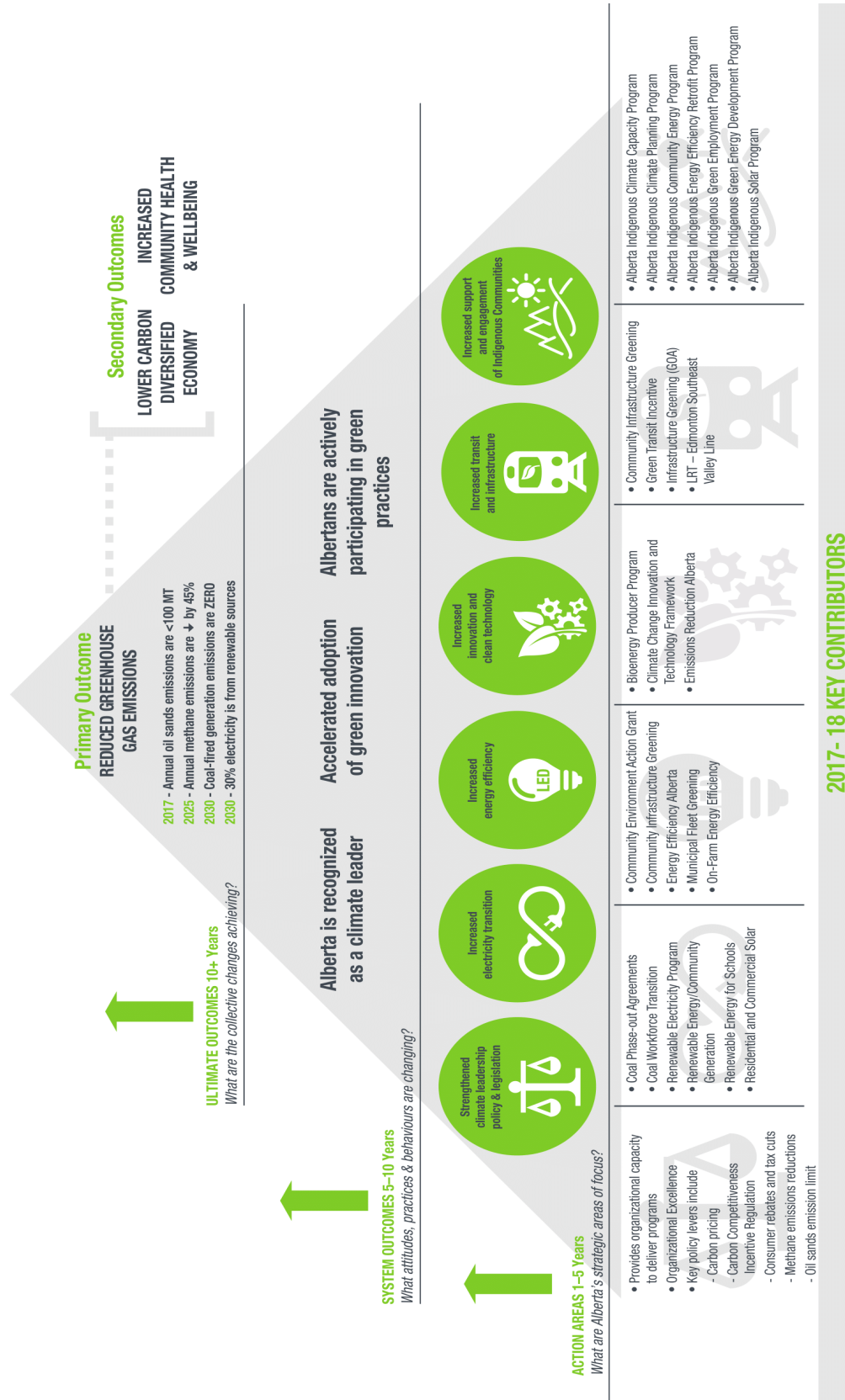
Expected Job Impact

Jobs Supported is an estimate based on the CLP one-year investment. Statistics Canada calculates the estimates using input-output models for CLP's 2017-18 actual spending as described in Green Skills and Employment, 2.1 Alberta Jobs Supported. Jobs are rounded to the tens in the strategic investment infographic.

Expected Impact of Investment – Cumulative GHG Emissions Reductions to 2021

Cumulative GHG emissions reductions to 2021 are estimated based on expected results of one year of spending; results are cumulated from 2017 to 2021, inclusive. Policy and legislation emissions reductions are estimated using the Navius model described above. All other action area estimates are calculated on an aggregate of estimated cumulative reductions from programs that received funding in 2017-18.

CLIMATE LEADERSHIP PLAN OUTCOME FRAMEWORK



Glossary

ACLAR	Alberta Climate Leadership Adjustment Rebate	KWh	Kilowatt hour
AER	Alberta Energy Regulator	LED	Light Emitting Diode
AESO	Alberta Electric System Operator	LRT	Light Rail Transit
AI	Alberta Innovates	LTO	Long Term Outlook
ARIF	Alberta Research and Innovation Framework	MCCAC	Municipal Climate Change Action Centre
BEST	Biotech, Electricity, Sustainable Transportation	Mt	Megatonnes
BPP	Bioenergy Producer Program	MSP	Municipal Solar Program
CCIR	Carbon Competitiveness Incentive Regulation	MW	Megawatt
CCITF	Climate Change Innovation and Technology Framework	NA	Not Available
CCP	Cost Containment Program	NEB	National Energy Board
CLP	Climate Leadership Plan	NEET	Non-Profit Energy Efficiency Transition
CO ₂ e	Carbon Dioxide Equivalent	NGO	Non-Government Organization
DEMI	Distributed Energy Management Initiative	NIR	National Inventory Report
ECCC	Environment and Climate Change Canada	NRCan	Natural Resources Canada
EDT	Economic Development and Trade	OFEMP	On-Farm Energy Management Program
EEA	Energy Efficiency Alberta	OSAG	Oil Sands Advisory Group
ERA	Emissions Reduction Alberta	PCF	Pan-Canadian Framework
ESAP	Energy Savings for Agri-Processors	RECG	Renewable Energy/Community Generation
GDP	Gross Domestic Product	REP	Renewable Energy Program
GHG	Greenhouse Gas	RNCESP	Residential No-Charge Energy Savings Program
GJ	Gigajoule (10 ⁹ joules)	RRO	Regulated Rate Option
GoA	Government of Alberta	SDTC	Sustainable Development Technology Canada
ICLI	Indigenous Climate Leadership Initiative	SGER	Specified Gas Emitters Regulation
ICT	Innovation and Clean Technology	STS	Solar Technology System (Alberta Education)
IEP	Irrigation Efficiency Program	TAME	Taking Action to Manage Energy
Kt	Kilotonne (1,000 tonnes)	TBD	To Be Determined
		tCO ₂ e	Tonnes of CO ₂ e

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